A SYNOPSIS OF ACONITUM SUBGENUS LYCOCTONUM: II*

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ABSTRACT. This paper concludes the classification of sect. *Lycoctonum* and deals with series *Laevia*, *Reclinata*, *Volubilia*, *Longibracteolata*, *Micrantha*, *Brevicalcarata*, *Longicassidata*, *Ranunculoidea* and *Lycoctonia*. All series except *Volubilia* and *Longicassidata* are newly described. Thirty-five species are discussed and there are two new varieties, *A. laeve* Royle var. *curvipilosum* Tamura & Lauener and *A. pterocaule* Koidz. var. *glabrescens* [Tamura ex] Tamura & Lauener, and five new combinations, *A. pterocaule* Koidz. var. *albidum* (Nakai) Tamura & Lauener, *A. moldavicum* Hacquet var. *sinomontanum* (Nakai) Tamura & Lauener, *A. moldavicum* var. *sinomontanum* f. *pilocarpum* (W. T. Wang) Tamura & Lauener, *A. wardii* Fletcher & Lauener var. *hopeiense* (W. T. Wang) Tamura & Lauener and *A. gigas* Lévl. & Van. var. *hondoense* [Nakai ex] Tamura & Lauener.

This is the second and final part of the Synopsis and deals with the remaining series of sect. *Lycoctonum*, the key to which was given in part I (p. 118).

Dr W. Gutermann of the Botanical Institute of Vienna University, has kindly pointed out to us that subgen. *Paraconitum* Rapcs. is predated by subgen. *Lycoctonum* (DC.) Peterm. In his *Deutschlands Flora* (pp. 15–16, 1846) Petermann raised the Candollean sections of *Aconitum*, i.e. *Anthora*, *Napellus*, *Cammarum* and *Lycoctonum* to subgeneric rank. Subgen. *Lycoctonum* (DC.) Peterm. should therefore replace subgen. *Paraconitum* as the latter name is based on the same type species. The subgeneric name given on p. 115 and in the title, p. 113, therefore, should be replaced by subgen. **Lycoctonum** (DC.) Peterm., Deutschl. Fl. 16 (1846).

I am also grateful to Dr Gutermann for drawing our attention to a mistake on pp. 113 & 114 where we attribute the genus *Lycoctonum* to Fournier—the correct author is Fourreau.

Among the species considered here are many from Japan and adjacent regions. Nakai's species in particular required a thorough examination, resulting in many of his taxa being relegated to synonymy.

Ser. *Lycoctonia* includes all the European species, except *A. lasiostomum* (ser. *Longicassidata*), but many of the synonyms are not included because we do not know what they represent.

Mention must be made of the unpublished dissertation by Klaus Warncke on the European species of the *Aconitum Lycoctonum* group, which has been of considerable help to us. There is no doubt that he studied the species and hybrid complexities of this particular group very thoroughly. *Flora Europaea* (1964) followed his work to some extent, but we have not accepted Warncke's solution to the problems and indeed have not always agreed with it.

Considerably more field and herbarium work is necessary to elucidate the complexities and synonymy of some species and our work on this group is by no means exhaustive or intended to be definitive.

* Continued from *Notes R.B.G. Edinb.* 37:124.
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Summary of Classification

(Page nos. given for species and varieties)

Sect. *Galeatum*	1. *moschatum* (116)
Sect. *Fletcherum*	2. *fletcheranum* (117)
Sect. *Alatospermum*	3. *novoluridum* (117)
Sect. *Lycoctonum*	
Ser. *Scaposa*	4. *scaposum* (119)
	4a. var. *chloranthum* (121)
	4b. var. *patentipilum* (121)
	5. *cavaleriei* (121)
	6. *aggregatifolium* (123)
Ser. *Crassiflora*	7. *crassiflorum* (123)
Ser. *Laevia*	8. *laeve* (433)
	8a. var. *curvipilosum* (433)
Ser. *Reclinata*	9. *reclinatum* (434)
Ser. *Volubilia*	10. *alboviolaceum* (434)
	11. *loczyanum* (436)
	12. *pseudolaeve* (437)
	13. *quelpaertense* (438)
	14. *chrysopilum* (439)
	15. *pterocaule* (439)
	15a. var. *albidum* (440)
	15b. var. *glabrescens* (441)
	16. *pteropus* (441)
	17. *desoulavyi* (442)
Ser. *Longibracteolata*	18. *sukaczevii* (442)
Ser. *Micrantha*	19. *apetalum* (443)
	20. *sajanense* (443)
Ser. *Brevicalcarata*	21. *brevicalcaratum* (444)
	21a. var. *lauenerianum* (444)
Ser. *Longicassidata*	22. *barbatum* (445)
	22a. var. *puberulum* (447)
	23. *kirinense* (448)
	23a. var. *australe* (449)
	24. *lasiostomum* (449)
Ser. *Ranunculoidea*	25. *ranunculoides* (450)
	26. *ajanense* (450)
	27. *crassifolium* (451)
Ser. *Lycoctonia*	28. *septentrionale* (452)
	29. *moldavicum* (452)
	29a. var. *sinomontanum* (453)
	29b. var. *sinomontanum* f. *pilocarpum* (454)
	30. *wardii* (454)
	30a. var. *hopeiense* (454)
	31. *angustius* (455)
	32. *orientale* (455)
	33. *iranshahrii* (455)
	34. *ranunculifolium* (455)

Ser. *Lycoctonia* (cont.)

Ser. Laevia Tamura & Lauener, **ser. nov.**

Caulis ramosus, foliatus. Folia basalia sub anthesi plerumque emarcida, caulina 5 in numero vel ultra. Inflorescentia ramosa, paniculata, multiflora, pedicellis ad 35 mm longis, ascendentibus vel arcuato-ascendentibus, bracteolis lanceolatis, linearibus vel filiformis. Flores purpurascentes vel flavescentes; casside 10–17 mm alta, 3–5 mm lata. Petala ad 16 mm longa, stipitibus ad apicem curvatis, calcaribus curvatis, laminis aequilongis. Monotypic.

This series is characterised by the branching leafy stem with very well developed, broad, not strongly dissected, cauline leaves and elongated inflorescence branches.

8. A. laeve Royle, Ill. Fl. 56 (1834); Stapf in Ann. Roy. Bot. Gard. Calc. 10: 136, t. 92 (1905); Mukerjee in Bull. Bot. Surv. Ind. 3:100 (1961); Lauener in Notes R.B.G. Edinb. 36:135 (1978).

var. **laeve**

Type. India, Himachal Pradesh, Kunawar (lecto. LIV).

Kashmir, W Nepal, India (Himachal Pradesh, Uttar Pradesh).

Plant to 210 cm tall. Basal leaves large, up to 50 cm broad (*fide* Lace); lower cauline leaves divided to $^1/_3$–$^1/_5$ from the base, up to about 25 cm broad; upper cauline leaves smaller and shortly petiolate, leaf-like, underside usually curled-hairy. Inflorescence spreading-hairy, somewhat glandular. Helmet shortly spreading-hairy or glabrate. Carpels spreading-hairy or glabrate. Fig. 1E.

8a. A. laeve Royle var. **curvipilosum** Tamura & Lauener, **var. nov.**

A typo inflorescentiis curvipilosis nec patenter villosis differt.

Type. Kashmir, Jhelum Valley, nr Rampur, Tilpatra Forest, 7500 ft, grows to 7 ft, white, 6 vii 1940, *Ludlow & Sherriff* 7746 (holo. BM, iso. E).

Kashmir, W Pakistan, India (Himachal Pradesh, Uttar Pradesh).

We have examined many specimens of *A. laeve* and they are quite clearly divisible into those with spreading-hairy or curled-hairy inflorescences, irrespective of geographical distribution. The type variety has spreading hairs and we therefore separate those specimens with curled hairs as var. *curvipilosum*. The helmet of this variety is also usually curled-hairy but sometimes spreading-hairy or glabrate. The carpels are curled-hairy or glabrate.

Ser. **Reclinata** Tamura & Lauener, **ser. nov.**

Syn.: Subgen. *Tuberaconitum* Rapcs. sect. *Euaconitum* C. A. Mey. subsect. *Palmata* Rapcs. in Növényt. Közlem. 6:140, 157 (1907), *p.p.*

Caulis ascendens demum prostratus, ramosus, foliatus, ramis gracilibus, divergentibus. Inflorescentia paniculata, laxiflora, pedicellis divaricatis, arcuato-ascendentibus sub anthesi ad 4 cm longis, bracteolis filiformis brevissimis ad 1 mm longis. Flores albo-cremi; casside 13–16 mm alta, 3–5 mm lata. Petalae graciliae, calcaribus semicircinatis lamina fere aequilongis, laminis geniculatis, distincte bilobatis. Monotypic.

This series resembles ser. *Laevia* in the branching leafy stem, but differs in the sprawling habit, the more divaricate branches and pedicels, and the smaller, slightly more divided leaves.

As far as we know ser. *Reclinata* is the only representative of subgen. *Lycoctonum* in the New World.

9. A. reclinatum A. Gray in Hook., London Journ. Bot. 2:118 (1843); Small, Fl. S E United States 435 (1903); Rapcs. in Növényt. Közlem. 6:162 (1907); Fernald in Gray's Man. Bot. (8th ed.) 671 (1950); Redford, Ahles & Bell, Man. Vasc. Fl. Carolinas 455 (1968); Keener in Castanea 41:14 (1976).

Type. U.S.A., Carolina, Alleghany Mts, Negro Mountain & Grandfather Mt., 4–5,000 ft, 9 vii 1841, *A. Gray* (holo. NY—*n.v.*, iso. E-GL,K).

U.S.A. (Carolina, West Virginia, Virginia, Georgia).

Stem 0·5–3 m. Leaves divided $^1/_4$–$^1/_7$ from the base (lower leaves 15–20 cm broad—*fide* Small *loc. cit.*), underside sparsely curled-hairy. Inflorescence curled-hairy. Helmet minutely and sparsely curled-hairy or glabrate. Carpels glabrous. Fig. 1F.

Ser. **Volubilia** (Nakai) Tamura & Lauener, **stat. nov.;** Steinb. in Fl. URSS 7:192 (1937), *nom. inval.*

Syn.: Ser. *Pubescentia* Steinb. in Fl. URSS 7:193 (1937), *nom. inval.*

Ser. *Ampelifolia* Vorosh. in Journ. Bot. URSS 30:129 (1945), *nom. inval.*; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:61 (1965), *nom. inval.*

Sect. *Volubilia* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:2 (1953).

Sect. *Curvicassidata* Nakai, *ibid.*: 3 (1953), *p.p.*

Subsect. *Volubilia* Tamura in Sci. Rep. Osaka Univ. 15:30 (1966), *comb. inval.*

Stem erect, decumbent or twining. Leaves 5–7-fid to $\frac{1}{2}$–$\frac{1}{4}$ from the base, segments ovate or obovate with ovate or obovate-obtuse mucronate teeth, hairs on both surfaces varying from spreading to curled, rarely glabrate. Inflorescence racemose, elongate or more or less aggregate, rather crowded with 5–20 flowers; pedicels 3–15 mm in flower, erect-ascending, hardly elongating after flowering, bracteoles linear. Flowers dilute purple, sometimes whitish; helmet tubular, 15–20 (–25) mm high, 4–6 × longer than its narrowest part, contracted at the middle, recurved at the tip. Petals glabrous, spur $1\frac{1}{2}$–3 × longer than lamina, curved or coiled, lamina geniculate. 5 species. Type species. *A. albo-violaceum* Kom.

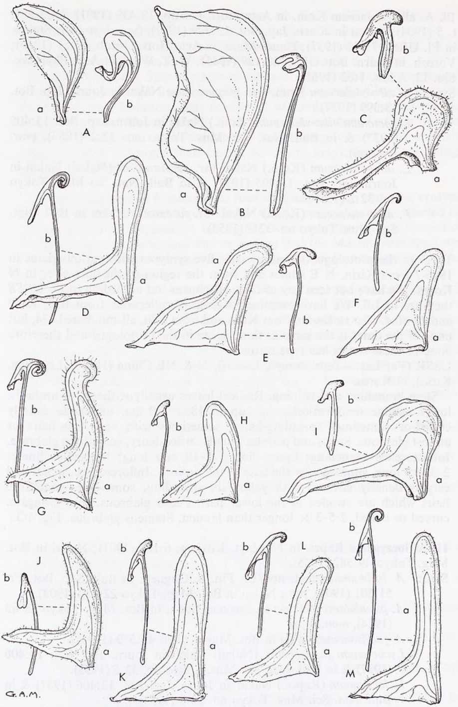


FIG. 1. Helmets (a) and petals (b) of *Aconitum* species: A, *A. moschatum*, *Duthie* 1420; B, *A. fletcheranum*, *Ludlow, Sherriff & Hicks* 17198; C, *A. novoluridum*, *Ludlow, Sherriff & Taylor* 5990; D, *A. crassiflorum*, *Handel-Mazzetti* 7691; E, *A. laeve*, *Ludlow & Sherriff* 9287; F, *A. reclinatum*, *Bozeman* 10684; G, *A. alboviolaceum*, *Komarov* 674; H, *A. sukaczevii*; I, *A. apetalum*, *Appleton* 734; J, *A. brevicalcaratum*, *Forrest* 11098; K, *A. barbatum*, *Karo* 422; L, *A. ranunculoides*, *Martin* a.1887; M, *A. septentrionale*, *Greville* a.1828. All x 2.

D

10. A. albo-violaceum Kom. in Acta Hort. Petrop. 18:439 (1901) & 22:251, t. 5 (1904); Nakai in Journ. Jap. Bot. 13:399 (1937), (var. *typicum*); Steinb. in Fl. URSS 7:192 (1937); Hand.-Mazz. in Acta Hort. Gotob. 13:81 (1939); Vorosh. in Journ. Bot. URSS 30:129 (1945); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965).

Syn.: *A. albo-violaceum* Kom. var. *purpurascens* Nakai in Journ. Jap. Bot. 13:399 (1937).

Lycoctonum albo-violaceum (Kom.) Nakai in Journ. Jap. Bot. 13:405 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:2 (1953), (var. *typicum*).

L. albo-violaceum (Kom.) Nakai var. *purpurascens* (Nakai) Nakai in Journ. Jap. Bot. 13:405 (1937) & in Bull. Nat. Sci Mus. Tokyo no. 32:2 (1953).

L. albo-violaceum (Kom.) Nakai var. *fuscescens* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:2 (1953).

Type. In the protologue Komarov cites five syntypes with various dates in 1896-7 from Kirin, N E China and from the region of the Jalu river in N Korea. We have not seen any of these specimens but according to *Fl. URSS* they are in LE. We have examined Komarov collections from BM, K, P and TI of *A. albo-violaceum* from Kirin and from Jalu, all numbered 674, but none of the dates is the same as those given in the protologue and therefore none of these sheets has type status.

USSR (Far East—Zeya Bureya, Ussuri), N & NE China (Hopei, Liaoning, Kirin), N Korea.

Stem branching and twining. Radical leaves usually withered at anthesis, lower cauline reniform-orbicular, up to 18 × 20 cm, underside usually curled-or sometimes spreading-hairy, sometimes with very few hairs or almost glabrous. Stems and petioles usually curled-hairy, sometimes glabrate. Inflorescence branching; bracts linear, 2–10 mm long; bracteoles linear, 2–3 mm long, situated near the base of the pedicels. Inflorescence, sepals and carpels densely covered with yellowish, spreading, somewhat glandulose hairs which are swollen in the lower part. Petals glabrous, spur elongate, curved or coiled, 2·5–3 × longer than lamina. Stamens glabrous. Fig. 1G.

11. A. loczyanum Rapcs. in Növényt. Közlem. 6:168 (1907); Nakai in Bot. Mag. Tokyo 49:582 (1935).

Syn.: *A. lycoctonum* auct. non L.; Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:501 (1904), *p.p.*; Nakai in Bot. Mag. Tokyo 22:130 (1908).

A. pseudolaeve Nakai var. *erectum* Nakai in Bot. Mag. Tokyo 28:62 (1914), *nom. inval.*

A. fudjisanense Nakai in Bot. Mag. Tokyo 49:579 (1935).

Lycoctonum fudjisanense (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:5 (1953).

L. loczyanum (Rapcs.) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:8 (1953), *p.p.*

L. pseudolaeve (Nakai) Nakai var. *volubile* Nakai f. *flexuosum* (Nakai) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:8 (1935), *p.p.*

A. albo-violaceum Kom. var. *erectum* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965).

Type. Japan, Nagasaki, 1863, *Maximowicz* s.n. (lecto. BM); *Zollinger* 434 (syntype P), *Hilggendorf* s.n. (syntype—n.v.), *Rein* 169 (syntype—n.v.).
Japan (W & Central Honshu—Kodzuke, Shimotsuke, Musashi, Kai, Shinano; Shikoku; Kyushu), China (Shantung, Hopei), S Korea.

Plant 25–90 cm tall. Stem erect or decumbent. Leaves orbicular-pentagonal or reniform, underside usually curled–sometimes spreading-hairy. Pedicels 10–15 mm long, bi-bracteolate; bracteoles situated from about the middle to near the base. Helmet about 20 mm high, 4 mm broad at the middle. Petals glabrous, spur elongate, about 6 mm long, curved, not strongly coiled, 1·5–2·5 × longer than lamina (c. 3 mm long). Carpels spreading-hairy or glabrate.

Under *A. loczyanum* Rapaics cited four specimens which comprise syntype material. Of these we have seen *Zollinger* 434 (P) and a specimen collected by *Maximowicz* from Nagasaki in 1863 (BM). We do not know where the rest of Rapaics' syntypes are located but we believe that the Maximowicz specimen in the British Museum is at least an isosyntype and we here designate it as the lectotype of *A. loczyanum*.

The stem of *A. loczyanum* is somewhat angular and in Japanese plants it is usually erect, sometimes decumbent and branched. The radical leaves, in contrast with those of *A. albo-violaceum*, are well preserved at anthesis and usually smaller and orbicular-pentagonal (although larger leaves are usually reniform). The hairs on the inflorescence axis of *A. loczyanum* are curled, but those on the pedicels and flowers are spreading. In plants of Kyushu and Shikoku the carpels are always hairy but in Honshu plants they are usually glabrous and only rarely hairy. Despite these variations we have been unable to divide *A. loczyanum* into geographically distinct races.

Nakai distinguished *A. fudjisanense* on the basis of the stem being distinctly winged but this character is not very reliable.

The carpels of *A. albo-violaceum* var. *erectum* are glabrous and we regard this variety as falling within the range of *A. loczyanum*.

The collection *Cavalerie* 3830 cited by Handel-Mazetti under *A. loczyanum* belongs to *A. pterocaule*.

12. A. pseudolaeve Nakai in Bot. Mag. Tokyo 27: 128 (1913), *nom. nud.* & in Rep. 1st Sci. Exp. Manch. sect. 4, 2:139 (1935), *in clavi*.

Syn.: *A. pseudolaeve* Nakai var. *erectum* Nakai in Bot. Mag. Tokyo 28:62 (1914), *nom. inval., p.p.*

A. pseudolaeve Nakai var. *flexuosum* Nakai, *ibid.*: 63 (1914), *nom. inval.*

A. pseudolaeve Nakai var. *volubile* Nakai, *ibid.*: 64 (1914), *nom. inval., p.p.*

Lycoctonum pseudolaeve (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937).

L. pseudolaeve (Nakai) Nakai var. *volubile* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:7 (1953), descr. in Bot. Mag. Tokyo 28:64 (1914), *p.p.*

L. pseudolaeve (Nakai) var. *volubile* Nakai f. *flexuosum* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:8 (1953), *p.p.*

Type. Korea, Prov. Kogen, Mt. Kongosan, 14 viii 1902, *T. Uchiyama* s.n. (syntype TI). The other syntypes consist of several Uchiyama collections of the same date, all annotated *A. pseudolaeve* by Nakai.
Korea (Kogen, Keiki).

Stem decumbent or flexuose, much branched. Underside of leaves curled—sometimes spreading-hairy on veins. Inflorescences racemose, contracted, covered with curled brownish hairs, but pedicels often villous. Hairs on flowers rather spreading. Bracts and bracteoles linear or filiform, 6–17 mm long, bracteoles situated near base of pedicels. Carpels glabrous.

Nakai cited the above syntype as the type of his *A. pseudolaeve* var. *volubile*, *loc. cit.* (1953). In 1914 he divided *A. pseudolaeve* into three varieties, though their names were invalid. We regard var. *volubile* as the typical variety of *A. pseudolaeve* for the following reason:

A. pseudolaeve Nakai was validly published in 1935, but no specimens were cited and there is therefore no holotype. Although Nakai's three varieties of *A. pseudolaeve* (var. *erectum*, var. *flexuosum* and var. *volubile*) were provided with Latin descriptions in 1914, *A. pseudolaeve* itself was not then validly published and so the three varieties were not validly published at that time. In Nakai (1953) *A. pseudolaeve* var. *erectum* f. *genuinum* was treated as a synonym of *Lycoctonum loczyanum*. In the same publication f. *flexuosum* was regarded as a form of *L. pseudolaeve* var. *volubile* and was provided with a Latin diagnosis, and this is the only infraspecific taxon validly published under *Aconitum pseudolaeve* or *Lycoctonum pseudolaeve*. Among the three varieties, only var. *volubile* remained under *L. pseudolaeve* in varietal rank. Accordingly *L. pseudolaeve* var. *volubile* represents *L. pseudolaeve* itself, and the specimens cited as the type of the variety are also regarded as the type of the species.

This species seems to be an intermediate condition between *A. loczyanum* and *A. pterocaule* in the hairiness of the inflorescence axis and flowers, but is characterized by the long filiform bracts and bracteoles. The habit resembles that of *A. pterocaule*.

The area of distribution of *A. pseudolaeve* seems to be rather restricted in Korea.

13. A quelpaertense Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:145 (1935).
Syn.: *A. pseudolaeve* Nakai var. *erectum* Nakai in Bot. Mag. Tokyo 28:62 (1914), *nom. inval.*, *p.p.*
Lycoctonum quelpaertense (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:6 (1953), *p.p.*
Type. Korea, Quelpaert (Cheju-do), Mt. Hallasan, 1300 m, 15 viii 1912, *T. Ishidoya* 71 (holo. TI).
Korea (Quelpaert), endemic.

Stem erect or decumbent. Underside of leaves curled-or spreading-hairy. Inflorescence and outside of sepals spreading-hairy.

There are two specimens on the type sheet. The left-hand one is the lower part of a stem with leaves whose underside is spreading-hairy on the veins. The right-hand specimen shows an inflorescence, and small leaves whose underside is curled-hairy on the veins. Accordingly, they are different plants

but the type is certainly the right-hand specimen, because in his description Nakai wrote "lamina foliorum . . . infra . . . praeter nervos primarios antrorsum curvato-pilosellos glaberrima".

The holotype comprises only the upper part of the stem which seems to be erect. The leaves are sparsely curled-hairy on the veins and the inflorescence is considerably elongated. The carpels are spreading-hairy (though Nakai wrote "Ovaria 3, glabra" in the description). In the only other specimen of *A. quelpaertense*, *Taquet* 167 (TI) cited by Nakai, *loc. cit.* (1953), the stem is decumbent and well branched, the underside of the leaves sparsely spreading-hairy on the veins and the carpels are sparsely spreading-hairy or glabrate. In both specimens the inflorescences and flowers are spreading-hairy and this species seems to be related to *A. albo-violaceum*, though the stem is not twining and the carpels are not so densely hairy.

The specimen from Mt. Chiisan, Hozawa, viii 1937 (TNS) cited under *L. quelpaertense* by Nakai (1953) has curled hairs on the helmet and somewhat crisped hairs on the inflorescence, and may belong to *A. pterocaule*.

14. A. chrysopilum Nakai in Bot. Mag. Tokyo 49:579 (1935).

Syn.: *Lycoctonum chrysopilum* (Nakai) Nakai in Journ. Jap. Bot. 13:405 (1937) and in Bull. Nat. Sci. Mus. Tokyo no. 32:5 (1935).

Type. Japan, Honshu, Prov. Omi, in monte Ibukiyama, 31 viii 1920, *H. Suginome* s.n. (holo. TI).

Japan, (Honshu—Ohmi, Mt. Ibuki, limestone area). Endemic.

Stem, petioles and veins of underside of leaves with sparse, long, spreading brownish hairs. Pedicels and outside of sepals, and especially carpels, densely covered with semicurled brownish hairs.

This plant resembles *A. loczyanum* but is characterised by the brownish indumentum mentioned above.

15. A. pterocaule Koidz. in Bot. Mag. Tokyo 27:564 (1913); Nakai in Bot. Mag. Tokyo 49:583 (1935).

var. **pterocaule**

Syn.: *A. lycoctonum* L. var. *volubile* Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:502 (1904).

A. longe-cassidatum Nakai in Journ. Coll. Sci. Imp. Univ. Tokyo 26:27, t. 1 (1909) and 31:434 (1911); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:61 (1965).

A. pseudolaeve Nakai var. *volubile* Nakai in Bot. Mag. Tokyo 28:64 (1914), *nom. inval., p.p.*

A. siroumense Nakai in Bot. Mag. Tokyo 49:581 (1935).

Lycoctonum longicassidatum (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) and in Bull. Nat. Sci. Mus. Tokyo no. 32:6 (1953).

L. pterocaule (Koidz). Nakai in Journ. Jap. Bot. 13:406 (1937) and in Bull. Nat. Sci. Mus. Tokyo no. 32:5 (1953).

L. siroumense (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) and in Bull. Nat. Sci. Mus. Tokyo no. 32:7 (1953).

A. finetianum Hand.-Mazz. in Acta Hort. Gotob. 13:80 (1939). W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:61 (1965).

A. sioseanum Migo in Journ. Shanghai Sci. Inst. 14:133 (1944)—*fide* W. T. Wang in Acta Phytotax. Sin 12, Addit. 1:61 (1965) *pro syn. sub A. finetianum.*

L. quelpaertense (Nakai) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:6 (1953), *p.p.*

L. pseudolaeve (Nakai) Nakai var. *volubile* (Nakai) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:7 (1953), *p.p.*

L. loczyanum (Rapcs.) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:8 (1953), *p.p.*

A. loczyanum Rapcs. var. *pterocaule* (Koidz.) Ohwi in Fl. Jap. ed. 1, 534 (1953), *comb. inval.*, & in Bull. Nat. Sci. Mus. Tokyo no. 33:72 (1953) & Fl. Jap. (Engl. ed.) 455 (1965).

Type. Japan, Honshu, Iwasiro, Sumomodaira pede montis Adzumasan, 12 ix 1913, *Koidzumi* s.n. (holo. TI, iso. KYO).

Japan (Honshu—Rikuchu, Rikuzen, Ugo, Shinano, Iwashiro), China (Kweichow, Kiangsi), Korea.

Plant 50–150 cm long. Stem usually decumbent, perhaps sometimes erect, more rarely climbing, strongly angular or winged. Inflorescence and outside of sepals always curled-hairy. Carpels usually curled-hairy, sometimes glabrous.

The leaves of *A. pterocaule* are similar in shape and size to those of *A. albo-violaceum*. The underside is usually curled-hairy on the veins but spreading-hairy on some Korean specimens. The petals are similar to those of *A. loczyanum*.

According to Nakai, the stem of *L. siroumense* is terete but in the holotype specimen (TI) it is angular. The carpels of the holotype are minutely curled-hairy, but glabrous in the isotype.

The type of *A. finetianum* is a specimen collected by Bullock from the Lushan Mts near Kiu-Kiangsi (K). Leaves of this specimen are strigose-pilose as described by Handel-Mazzetti. He also cited *David* s.n. from Kiangsi (P), the type of *A. lycoctonum* var. *volubile*, but the underside of the leaves of this specimen are curled-hairy at the veins as also is the type specimen of *A. longecassidatum* (TI). Many Korean specimens have been seen and in them this character is variable, but in all the Japanese specimens examined the leaves are always curled-hairy on the underside.

The flowers of Japanese plants of *A. pterocaule* are pale purple, but the flower colour of Korean plants is even more dilute and usually whitish.

A. sioseanum has not been listed in the *Index Kewensis.*

15a. A. pterocaule Koidz. var. **albidum** (Nakai) Tamura ex Tamura & Lauener, **comb. nov.**: Tamura in Ohwi, Fl. Jap. ed. 2:623 (1965), *comb. inval.*

Syn.: *A. septentrionale* Koelle var. *alboviolaceum* Nakai f. *albidum* Nakai in Bot. Mag. Tokyo 25:52 (1911), *excl. syn.*

A. pseudolaeve Nakai var. *erectum* Nakai f. *albidum* (Nakai) Nakai in Bot. Mag. Tokyo 28:63 (1914), *comb. inval.*

A. koisikawense Nakai in Bot. Mag. Tokyo 49:580 (1935).

A. sinanomontanum Nakai in Bot. Mag. Tokyo 49:580 (1935).

Lycoctonum koisikawense (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:5 (1953).

Type. Cultivated in Koishikawa Botanic Garden, University of Tokyo, 3 ix 1894, *T. Makino* (holo. TI).
Japan (Central Honshu—Musashi, Shinano).

This plant is distinguished from var. *pterocaule* by the carpels being densely covered with long, slightly curled, yellowish hairs. The stem is erect or more or less decumbent and not so strongly winged as in var. *pterocaule*.

A. septentrionale var. *alboviolaceum* f. *albidum* was published by Nakai without any citation of specimens and when he published the combination *A. pseudolaeve* var. *erectum* f. *albidum* he gave its locality as Honshu and the Garden "In alpinis Nippon rara et in hortis Japonicis colitur (olim vulgaris nunc rara)". These names were cited as synonyms at the time of publication of *A. koisikawense* and it is clear that they represent the same taxon. Accordingly, the type specimen of *A. koisikawense* is regarded as the type of *A. septentrionale* var. *alboviolaceum* f. *albidum*.

The type specimen of *A. sinanomontanum* was collected in Prov. Shinano in Central Honshu but the detailed locality was not given. The stem of *A. sinanomontanum* is slightly decumbent, the leaves reniform and the hairs of the carpels are the same as those of *A. koisikawense*. The flowers of the latter species are said to be whitish, but decolouration of the flowers is not uncommon in this group.

15b. A. pterocaule Koidz. var. **glabrescens** [Tamura ex] Tamura & Lauener **var. nov.**; Tamura in Ohwi, Fl. Jap. ed. 2:623 (1965), *nom. nud.*

Caulis erectus angulatus vix alatus. Folia radicalia $(\frac{1}{3}-)\frac{1}{4}-\frac{1}{6}(-\frac{1}{8})$ inferum 5-partita, segmentibus lobatis grosse–vel inciso-dentatis, dentibus ovatis, ovato-oblongis vel oblongis. Carpella minute curvi-pilosa vel glabrata.
Type. Japan, Honshu, Prov. Shinano, between Todai and Kitazawa Pass, 1900 m, ix 1954, *G. Murata* 8129 (holo. KYO).
Japan (Honshu—Shinano, Mikawa, Mino, Ohmi, Ise, Yamashiro, Shimotsuke, Kai).

This plant is distinguished from var. *pterocaule* by the erect, unwinged stem and by the more deeply toothed leaves. The leaf segments are deeply incised especially in specimens from the type locality situated in the subalpine zone.

16. A. pteropus Nakai in Journ. Jap. Bot. 13:400 (1937).
Syn.: *Lycoctonum pteropus* (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:4 (1953).
Type. Korea, Prov. Kogen, Rankoku tractus Waiyo, 14 viii 1916, *T. Ishidoya* 1568 (holo. TI).
Korea (prov. Kogen), endemic.

Stem decumbent; upper part of stem and branches winged. Petioles distinctly winged. Veins on underside of leaves spreading- or semi-curled hairy. Inflorescences and outside of sepals curled-hairy (as in *A. pterocaule*). Bracts and bracteoles linear, 7–8 mm long. Carpels glabrous.

In ser. *Volubilia* the angulation of the stem is variable but in *A. pteropus* it is quite remarkable. However, this wing formation may be only an extreme form of that shown in *A. pterocaule*.

17. A. desoulavyi Kom. in Bull. Jard. Imp. Bot. St. Pétersb. 16:168 (1916); Steinb. in Fl. URSS 7:193 (1937).
Type. No type was cited by Komarov in his "Flora Yuzhno Ussuriskavo Kraya" but according to *Fl. URSS* the species was based on specimens from Nakhtakhe Bay.
USSR (Far East, Ussuri).

Stem, leaves and petioles densely covered with spreading hairs. Pedicels 5 mm long in flower. (Helmet 17–25 mm high, 4–7 mm wide in middle—*fide Fl. URSS*). Carpels spreading-hairy.

Only two specimens of *A. desoulavyi* were examined in Leningrad (by M.T.) but although little material has been seen we place this species in ser. *Volubilia* on account of the division and dentation of the leaf lamina and the flower colour.

Ser. **Longibracteolata** [Steinb. ex] Tamura & Lauener, **ser. nov.;** Steinb. in Fl. URSS 7:198 (1937), *nom. inval.*; Popov, Fl. Cent. Sibir. 1:24 (1957), "*Longibracteata*", *nom. inval.*

Inflorescentia simplex, laxe racemosa, patenter luteo-pilosa, pedicellis 3–5 mm longis, bracteis bracteolisque filiformis c. 10 mm longis, bracteolis flori contiguis. Flores flavovirentes; casside 10–15 mm alta, 4–5 mm lata. Calcaria petalorum capitata, paulo curvata. Monotypic.

18. A. sukaczevii Steinb. in Fl. URSS 7:198, 728, t. 13, f. 3a–d (1937); Popov in Fl. Cent. Sibir. 1:241 (1957); Vorosh. in Byull. Glav. Bot. Sada 64:37 (1967).
Type. Sibiria baicalensis, ad lacum Baical in angustiis Uluntui prope stationem viae ferreae Sljudjanka (holo. LE—*n.v.*).
USSR. (E Siberia—Angara Sayan).

We have not seen any specimens but the following brief description and that of the series are adapted from the *Fl. URSS*.

Plant small up to 45 cm tall. Basal leaves 8–10 cm broad, divided to $\frac{1}{4}$ from the base, segments broadly cuneate, appressed-hairy above, long straight hairs on the veins beneath. Helmet adpressed pilose. Carpels glabrous. Fig. 1H.

Ser. **Micrantha** [Steinb. ex] Tamura & Lauener, **ser. nov.;** Steinb. in Fl. URSS 7:200 (1937), *nom. inval.*; Vorosh. in Journ. Bot. URSS 30:129 (1945), *nom. inval.*; W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:59 (1965), *nom. inval.*, *p.p.*
Syn.: Subsect. **Micrantha** Tamura in Sci. Rep. Osaka Univ. 15:31 (1966), *comb. inval.*

Folia partita ultra medium sed non ad basin. Segmentibus cuneato-rhomboideis, inciso-dentatis, dentibus lanceolatis acutis vel acuminatis.

Inflorescentia 30–60 cm longa, longe racemosa, multiflora, floribus interdum ultra 120 in numero, pedicellis sub anthesi 6–11 mm longis. Flores flavescentes; casside parva usque ad 8 mm alta, 3–4 mm lata, rostro prominenti; petala parva, 4–9 mm longa, calcaribus capitatis, laminis calcari fere aequilongibus vel paulo longioribus, stipitibus erectis, limbo c. duplo longioribus. 2 species.
Type species. *A. apetalum* (Huth) B. Fedtsch.

This series is very distinct on account of its long, many-flowered racemes, very small flowers and petals, and the shape of the helmet.

19. A. apetalum (Huth) B. Fedtsch. ex Steinb. in Fl. URSS 7:200, t. 13 f. 5a–c (1937); Gamajunova in Pavlov, Fl. Kazachst. 4:50, t. 6, f. 3–3a (1961); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:59 (1965).
Syn.: *Delphinium apetalum* Huth in Bot. Jahrb. 20:398 (1895).
Type. Turkestan, prope initium faucium Aryslyn ad 3000 m, 1897, *A. Regel* s.n. (holo. LE).
Turkestan, China (Sinkiang).

Stem 2·5 m tall. Leaves divided to about $\frac{1}{4}$ from the base and curled-hairy beneath. Flowers curled-hairy. Bracteoles linear up to 10 mm long. Carpels densely hairy to glabrate. Fig. 1I.

Pachomova notes (*Consp. Fl. As. Med.* 3:188, 1972) that the citing of *A. apetalum* in Central Asia in *Fl. URSS* is evidently a mistake as there are no herbarium specimens from that area.

20. A. sajanense Kumin in Animadv. Syst. Herb. Univ. Tomsk 1–2:1 (1939); Vorosh. in Bot. Journ. URSS 30:129 (1945) & in Byull. Glav. Bot. Sada 64:36 (1967).
Type. Siberia, Krasnojarsk, in jugo Aradanskyi, ad fontes flum. Aradan, circa lacum Aradanskoe, in pratis subalpinis, 17 viii 1937, *A. Kuminova, V. Lichaczeva, T. Leikina* s.n. (holo. TK—*n.v.*).

The only material we have seen of this species is a collection by *Gudoshnikov* from Krasnoyarsk Kray (K) dated 2–10 viii 1960.

A. sajanense appears to differ from *A. apetalum* only in the spreading hairs on the inflorescence axis and pedicels, the almost glabrous flowers with a few spreading hairs, and the glabrous carpels. The undersides of the leaves are curled-hairy on the veins only.

The geographical distribution of *A. sajanense* lies further north than that of *A. apetalum.*

Ser. **Brevicalcarata** Tamura & Lauener, **ser. nov.**
Syn.: Ser. *Micrantha* Steinb.; Wang in Acta Phytotax. Sin. 12, Addit. 1:59 (1965), *p.p.*

Inflorescentia 25–40 cm longa, longe racemosa, multiflora, floribus interdum 40 ultra 80 in numero, pedicellis sub anthesi 2–5 mm longis. Flores purpurea; casside 14–20 mm alta, 5–6 mm lata, rostro prominenti angulato. Monotypic.

This series is related to ser. *Micrantha* in which Wang placed *A. brevicalcaratum*. Both series are similar in leaf form, presence of many-flowered racemes and the dense inflorescences. Ser. *Brevicalcarata* differs from ser. *Micrantha* in the larger purple flowers, very short pedicels and the larger bracts.

21. A. brevicalcaratum (Fin.&Gagnep.) Diels in Notes R.B.G. Edinb. 5:267 (1912), *p.p.*; Fletcher & Lauener in Notes R.B.G. Edinb. 20:186, t. 266, f. 10, t. 267 (1949); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:59 (1965).

var. **brevicalcaratum**

Syn.: *A. lycoctonum* L. var. *brevicalcaratum* Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:502 t. 6, f. 29 (1904), incl. f. *bracteatum*.
A. brevicalcaratum (Fin. & Gagnep.) Diels var. *parviflorum* Chen & Liu in Bull Fan. Mem. Inst. Biol. Ser. 11:43 (1941).

Type. China, Yunnan, Lankong, Hee-chan-men, 3000 m, 3 ix 1884, *Delavay* 975 (syntype *A. lycoctonum* var. *brevicalcaratum*—K, P); au col du Lo pin chan, lieux frais du pâturages, fl. bleu noirâtre ou pouıpre noirâtre, 1 x 1888, *Delavay* 3212 (syntype P).

China (Yunnan).

Leaves divided $\frac{1}{4}$–$\frac{1}{6}$ from the base, lower part of stem and leaves covered with yellow, curled, shining hairs which become spreading on the inflorescence and outside of the flowers. Flowers in varying shades of purple; petals glabrous, spur obtuse, capitate, shorter than the lamina. Carpels yellow, spreading-hairy or glabrate. Fig. 1J.

Fletcher & Lauener (*loc. cit.*) wrongly cited *Forrest* 2777 as the type of *A. brevicalcaratum*. It was the only specimen cited by Diels. We have examined the isotype of var. *parviflorum* and agree with Wang (1965) that it does not merit separation from the typical variety.

21a. A. brevicalcaratum (Fin. & Gagnep.) Diels var. **lauenerianum** (Fletcher) W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:59 (1965).

Syn.: *A. lauenerianum* Fletcher in Notes R.B.G. Edinb. 20:187, t. 266, f. 15 & 16 (1949).

Type. China, Yunnan, Eastern flank of the Lichiang range, plant of 3–4$\frac{1}{2}$ ft, flowers deep purplish-blue, open mountain meadows, ix 1910, *Forrest* 6559 (holo. E; iso BM, K, P).

China (Yunnan).

This variety is distinguished only by the distinct petals which have a slightly curved spur about 4–5 mm long.

Ser. **Longicassidata** (Steinb. ex Nakai) Tamura & Lauener, **ser. nov.;** Steinb. in Fl. URSS 7:201 (1937), *nom. inval., p.p.*; Popov, Fl. Cent. Sib. 1:239 (1957), *nom. inval., p.p.*; Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965), *nom. inval., p.p.*

Syn.: Subsect. *Barbatum* Vorosh. ser. *Pedatifolia* Vorosh. in Journ. Bot. URSS 30:129 (1945), *nom. inval.*
Subsect. *Vulparia* Vorosh. ser. *Pallida* Vorosh., *op. cit.*: 130 (1945), *nom. inval.*
Sect. *Longicassidata* [Steinb. ex] Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:9 (1953), *p.p.*
Subsect. *Longicassidata* Tamura in Sci. Rep. Osaka Univ. 15:31 (1966), *comb. inval.*

Stem terete, erect. Inflorescence long, racemose, densely flowered, 15–35 flowers; pedicels erect-ascending, 4–10 mm long in flower, usually with short curled hairs. Flowers always yellow, often turning dark yellow in drying, usually curled-hairy; helmet tubulose, 11–24 mm high, 3·5–5·5 × longer than its narrowest part, slightly contracted at the middle, erect or recurved at the tip. Petals glabrous, not reaching top of helmet, stalk erect or slightly curved in upper part, spur short or slightly elongate, obtuse, straight or slightly curved, lamina nearly equal to or a little longer than the spur, rarely twice as long, sometimes geniculate. 3 species.
Type species. *A. barbatum* Pers.

The first valid publication of "*Longicassidata*" at infrageneric rank was sect. *Longicassidata* by Nakai but he did not cite a type species. The species he included in his section were *Lycoctonum togashii* (= *A. moldavicum* var. *sinomontanum*), *L. ranunculoides*, *L. kirinense*, *L. ajanense* var. *sachalinense* (= *A. ajanense*), *L. ochranthum* (= *A. barbatum* var. *puberulum*), *L. barbatum* and *L. sibiricum* (= *A. barbatum*).

Steinberg included *A. barbatum* and *A. kirinense* in his invalid ser. *Longicassidata* but Voroshilov removed these two species and created for them his invalid subsect. *Barbatum*. In selecting a lectotype for ser. *Longicassidata* the classifications of Steinberg and of Voroshilov can be ignored and attention focused on Nakai's species of his sect. *Longicassidata*. Of these species, *A. ranunculoides* and *A. ajanense* are removed to ser. *Ranunculoidea* and from the remaining two species, *A. barbatum* and *A. kirinense*, we select *A. barbatum*.

22. A. barbatum Pers., Syn. Pl. 2:83 (1806); Reichb., Ill. Gen. Acon. t. 45 (1825); Turcz., Fl. Baic.-Dahur. 1:79 (1842); Steinb. in Fl. URSS 7:204 (1937), *ex parte*; Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:149 (1935); Hand.-Mazz. in Acta Hort. Gotob. 13:83 (1939), *p.p.*; Vorosh. in Bot. Journ. URSS 30:129, f. 1g (1945) & in Byull. Glav. Bot. Sad. 64:36 (1967); Grubov, Consp. Fl. Mong. 139 (1955); Popov, Fl. Cent. Sib. 1:240 (1957); Lauener & Green in Notes R.B.G. Edinb. 23: 574 (1961); Gamajunova in Pavlov, Fl. Kazachst. 4:52, t. 6, f. 2a, 2b (1961).

var. **barbatum**

Syn.: *A. pyrenaicum* L., Sp. Pl. 532 (1753), *nomen rejiciendum propositum.*
A. squarrosum DC., Syst. Nat. 1:368 (1817).
A. leptanthum Reichb., Ill. Gen. Acon. t. 44 (1825).
A. sibiricum Poir., Encycl. Suppl. 1:113 (1810); Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:149 (1935).

A. gmelinii Reichb., Uebers. Gatt. Acon. 63 (1819) & Ill. Gen. Acon. t. 46 (1825); Turcz., Fl. Baic.-Dahur. 1:79 (1842).

A. barbatum Pers. var. *gmelinii* (Reichb.) Ledeb. ex Maxim. in Mém. Acad. Imp. Sci. St. Petérsb. 9:24 (1859).

A. lycoctonum L. var. *barbatum* (Pers.) Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:501 (1904).

Lycoctonum barbatum (Pers.) Nakai in Journ. Jap. Bot. 13:405 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:12 (1953).

L. sibiricum (Poir.) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:12 (1953).

Type. Habit. in Sibir. Patrin. (Herb. Juss.–*n.v.*).

USSR (W Siberia—Ob, Irtysh, Altai; E Siberia—Yenisei, Lena-Kolyma, Angara-Sayan, Dauria; Far East—Zeya Bureya–*fide Fl. URSS*), Mongolia, China (Hopei, Shansi, N E Distr.—Manchuria), N Korea.

Plant 40–130 cm tall; small plants often subscapose. Stem spreading-hairy towards the base. Leaves orbicular-pentagonal, up to 23 x 30 cm, 3-sect with the lateral segments deeply bi-partite into laciniate parts; laciniae linear-lanceolate; underside of leaves spreading-hairy, sometimes curled-hairy or glabrate; petioles at least with some of the hairs spreading. Axis of inflorescence, pedicels and outside of sepals usually curled-hairy, rarely spreading. Helmet 11–24 mm high, 3–5 mm broad at the middle. Limb of petal about 4 mm long, slightly or scarcely curved, lamina about 2·5 mm long. Carpels villous (less commonly so in the eastern part of its distribution range), curled-hairy or glabrate. Fig. 1K.

We have been unable to locate the type specimen of *A. barbatum* which was reported to be in P but is not now to be found there. A reputed type in K consists of two specimens, one labelled "Siberia, Prescott", the other "Dahuria".

This species has a wide distribution and exhibits various forms. In typical *A. barbatum*, according to Reichenbach and others, the lower part of the stem, the petiole, and the veins of the underside of the leaves are spreading-hairy, the leaf segments much incised into linear-lanceolate laciniae and the carpels hairy. The typical variety does not seem to occur in SE Manchuria, Korea or China.

We have seen various specimens determined as *A. gmelinii* but have been unable to locate a type or other authentic material. According to A. Lasègue's *Musée Botanique de Delessert* (1845, p. 322), Gmelin's specimens are in the Pallas Herbarium in BM, but the type has not been found there. Although there are some differences between *A. gmelinii* and *A. barbatum* in the division of the leaves and in the degree of hairiness of the stem and carpels, the former is generally and widely accepted as a synonym of the latter. Nakai united *A. gmelinii* and *A. sibiricum*, both distinguished from *A. barbatum* by the broader and less divided leaf segments and the less hairy, or even glabrous carpels. It may be that glabrous-carpelled specimens of *A. barbatum* belong to the concepts of *A. gmelinii* or *A. sibiricum*. Maximowicz, however, considered plants from Amur to have less deeply divided leaf segments, especially the laterals, and applied the name *A. barbatum* var. *gmelinii* to this group. Considering the variation in the specimens we have seen, we also do not think that *A. sibiricum* or *A. gmelinii* should be

separated from *A. barbatum*. Specimens with glabrous carpels and less divided leaves are more abundant at the eastern end of the distribution range of *A. barbatum*, and it is these specimens which some botanists may have regarded as *A. sibiricum* and *A. gmelinii*.

A. pyrenaicum L. has been regarded as being composed of different elements but there seems to be no doubt that it can be typified.

In *Species Plantarum* (1753) the Linnean protologue reads as follows:

> "Aconitum foliis multipartitis: laciniis linearibus incumbentibus squarrosis. *Hort. ups.* 152.*
> Aconitum pyrenaicum luteum, foliorum segmentis sibi invicem incumbentibus. *Raj. europ.* 367.
> *Habitat in* Siberia, Tataria, Pyrenaeis."

In *Hortus Upsaliensis* (1748) Linnaeus gave the habitat as "Sibiria, Tataria".

In the Linnean herbarium there are two specimens to be considered under *A. pyrenaicum* L. and these have been examined (by M.T.). On one of these sheets Linnaeus himself wrote "*Aconitum lycoctonum pyrenaicum*" and J. E. Smith annotated the same sheet "*A. squarrosum* DC.". Linnaeus' reference in his description to "*squarrose*" leaf segments certainly refers to this collection and the leaves and the petals are undoubtedly the same as those described in *A. barbatum*. In his *Syst. Nat.* (1:368, 1817) De Candolle cited "*A. pyrenaicum* L. (excl. syn. et patr.)" and "*A. squarrosum* Lin! herb." in synonymy under *A. squarrosum* DC. and retained *A. pyrenaicum* L. for the Pyreneean plant. De Candolle was therefore probably the first person to distinguish what he considered to be the separate elements of *A. pyrenaicum*.

The second sheet in the Linnean herbarium, on which Linnaeus wrote only "Aconitum ex Hispania" also bears the inscription "Pyrenaicum verum?" by J. E. Smith. The leaves and petals of this collection are the same as those found in *A. lamarckii* [Reichb. ex] Spreng. (= *A. vulparia* [Reich. ex] Spreng.). Whereas Gayer (1909) adopted the name *A. pyrenaicum* L. for Pyreneean plants with *A. ranunculifolium* Reichb. and *A. lamarckii* in synonymy, both Warncke and Tutin (1964) regarded *A. pyrenaicum* L. *p.p.* as synonymous with *A. lamarckii* and *A. ranunculifolium*.

The name *A. barbatum* has been widely used since the time of Reichenbach for the species distributed over much of the USSR and in northern China. *A. pyrenaicum*, on the other hand, has been generally accepted as being applicable to plants from southern Europe. Nevertheless, despite the probable intention of Linnaeus to apply the name *A. pyrenaicum* to Pyreneean plants, it seems from the evidence of the two sheets in the Linnean herbarium that the first of these here referred to, and which is identifiable as *A. barbatum*, must be regarded as typifying *A. pyrenaicum* L. and we choose it as the lectotype of this species. However, under Article 69 of the *International Code of Nomenclature*, Leningrad 1975, we suggest the rejection of *A. pyrenaicum* L. In addition to having been used for a taxon not including its type, the name itself would be inappropriate geographically and would also upset the long-standing usage of *A. barbatum*.

22a. A. barbatum Pers. var. **puberulum** Ledeb., Fl. Ross. 1:67 (1841).
Syn.: *A. ochranthum* C. A. Mey. in Ledeb., Fl. Alt. 2:285 (1830); Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:148 (1935).

Lycoctonum ochranthum (C. A. Mey.) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:12 (1953).
A. pekinense Vorosh. in Seed List State Bot. Gard. Acad. Sci. URSS 5:9 (1950); Botsch. in Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 19:624 (1959), *syn. nov*.

Type. Hab. in Sibiria altaica (Fl. Alt.) (typus–*n.v.*). USSR (Siberia), Mongolia, China (Shansi, Hopei–incl. Jehol, Liaoning).

A. barbatum var. *puberulum* differs from the typical variety in being curled-hairy on the stem and leaves. The carpels are curled-hairy or glabrate.

We have not seen Voroshilov's description but Botschantsev (*op. cit.*) relates *A. pekinense* to *A. barbatum* saying however, that it differs in the curved-appressed pubescence and the larger helmet.

According to Dr Wang (*in litt.*) the stem of *A. pekinense* is densely covered with appressed short soft hairs, and the leaves are palmately trisect to the base with the segments less divided and with triangular teeth. These observations are based on material from Shang-fang-shan (the type locality of *A. pekinense*) which has been seen by Wang. Since these characters correspond to *A. barbatum* var. *puberulum* we reduce *A. pekinense* to synonymy under this variety.

23. A. kirinense Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:147 (1935); Steinb. in Fl. URSS 7:205 (1937); Vorosh. in Journ. Bot. URSS 30:129 (1945).

var. **kirinense**

Syn.: *Lycoctonum kirinense* (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:11 (1953).
A. barbatum auct. non Pers.; Hand.-Mazz. in Acta Hort. Gotob. 13:83 (1939), *p.p.*
L. sibiricum (Poir.) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:12 (1953), *p.p.*
L. kirinense (Nakai) Nakai var. *villipes* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:11 (1953).

Type. Manchuria, Kirin, via inter Kirin et Omoso, Vallis Elldschanche, 22 vii 1896, *Komarov* 672 (holo. TI).

USSR (Far East—Zeya Bureya, Ussuri), China (Liaoning, N E Distr.—Manchuria), Korea.

Basal leaves fairly large, 8–19 × 12–26 cm, spreading-or sometimes curled-hairy beneath, divided to 6–30 mm from the base, leaf-segments less strongly incised than in *A. barbatum* but usually coarsely dentate. Lower part of stem and petioles spreading or sometimes curled-hairy. Carpels glabrous.

The same tendency towards less divided leaves and more glabrate carpels which is found in "*A. gmelinii*", is expressed more extremely in *A. kirinense*. There are specimens intermediate between the two, but we accept leaves less deeply divided as the character by which *A. kirinense* can be distinguished from *A. barbatum*.

Handel-Mazzetti reduced *A. kirinense* to *A. barbatum* based on his examination of *Komarov* 672 in Vienna, but Komarov numbered several

different collections of various dates as 672 and in the holotype of *A. kirinense* (TI) the leaves are not divided to the base and the carpels are glabrous, contrary to Handel-Mazzetti's observation, and the lower part of the stem is curled-hairy. A specimen of *Komarov* 672 dated 12 vii 1897 (BM) is *A. kirinense*, whereas another specimen of *Komarov* 672 dated 10 vii 1897 (K) is intermediate between *A. barbatum* and *A. kirinense* by virtue of its leaf form and hairy carpels.

23a. A. kirinense Nakai var. **australe** W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:63 (1965).
Type. China, Shensi, Tien-chu-shan, 2000 m, *T. P. Wang* 16377 (holo. PE–*n.v.*).
China (Shensi, Honan, Shansi).

Wang states that var. *australe* differs from the typical variety in that the entire under surface of the leaves is pubescent and the ovary nearly always yellow-puberulous.

24. A. lasiostomum [Reichb. ex] Besser, Enum. Pl. Vol. 69 (1822); Spreng., Syst. 2:620 (Jan.–May 1825); Reichb., Ill. Sp. Acon. Gen. t. 49 (Aug. 1825); Steinb. in Fl. URSS 7:205 (1927); Tutin in Fl. Europ. 1:211 (1964).
Syn.: *A. pallidum* Reichb., Ill. Sp. Acon. Gen. t. 50 (1825); Vorosh. in Journ. Bot. URSS 30:130 (1945).
A. besseranum Andrz. in Trud. Kom. Vys. Uchr. Kiev. no. 1:5 (1860).
A. leucanthum [Andrz. ex] Schmalh., Fl. Cent. & S Russia 1:31 (1895)–non. Reichb. (1819) *nom. nud.*
A. rogoviczii O. D. Wissjul in Ukrayin Bot. Zhurn. 6(2):59 (1949).
Type. USSR, prope urbem Medyn in Gubernio Kaluga, coll. unknown (typus LE–*fide Fl. URSS*–*n.v.*). (According to Warncke the Reichenbach illustration can be considered as the type).
USSR (west of Urals), Europe (Romania).

Leaves 3–5 partite to about $\frac{1}{4}$–$\frac{1}{6}$ from the base with broad cuneate segments and lanceolate teeth, undersurface of leaves usually curled-hairy. Inflorescence, flowers and carpels curled-hairy—carpels densely so.

This species is not quite typical of the subsect. *Longicassidata* as the leaves are somewhat less divided and the spur of the petal is longer than is usual in this section. In respect of these characters it approaches ser. *Lycoctonia* but the inflorescence is more typical of ser. *Longicassidata*, particularly in its short pedicels.

A. besseranum, *A. leucanthum* and *A. rogoviczii* are here placed in synonymy according to Warncke's work.

The authority for *A. lasiostomum* is usually attributed to Reichenbach but the description by Besser is clearly a valid one and the correct authority is as shown in the citation above.

Ser. **Ranunculoidea** [Steinb. ex] Tamura & Lauener, **ser. nov.**; Steinb. in Fl. URSS 7:194 (1937), *nom. inval.*; Popov, Fl. Cent. Sibir. 1:240 (1957), *nom. inval.*

Syn.: Ser. *Umbrosa* Steinb. in Fl. URSS 7:198 (1937), *nom. inval.*, *p.p.*
Sect. *Longicassidata* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:9 (1953), *p.p.*

Planta subscaposa ad 80 cm alta, folia orbicularia 3–14 cm lata. Inflorescentia laxe racemosa, curvato-pilosa, pauciflora, floribus 3–20 in numero, pedicellis 5–25 mm longis. Flores flavi; casside 13–20 mm alta, 3–5 mm lata; calcaria petalorum circinata vel semi-circinata. 3 species.
Type species. *A. ranunculoides.*

Ser. *Ranunculoidea* is characterised by the subscapose habit, lax inflorescence and rather small leaves with cuneate segments which usually do not overlap. This series differs from ser. *Scaposa* and ser. *Crassiflora* in the few-flowered raceme and the colour of flowers, but resembles both series in the subscapose habit.

25. A. ranunculoides [Turcz. ex] Ledeb., Fl. Ross. 1:67 (1841); Turcz. in Bull. Soc. Nat. Mosc. 11:86, no. 71 (1838) & Fl. Baic-Dahur. 1:78 (1842), *nom. nud.*; Steinb. in Fl. URSS 7:194, t. 13, f. la–f (1937); Popov, Fl. Cent. Sib. 1:240 (1957); Vorosh. in Byull. Glav. Bot. Sada 64:37 (1967).
Syn.: *A. lycoctonum* L. var. (?)β Turcz., Fl. Baic.-Dahur. 1:78 (1842).
A. lycoctonum L. var. *ranunculoides* (Turcz. ex Ledeb.) Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:502 (1904).
Lycoctonum ranunculoides (Turcz. ex Ledeb.) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:10 (1953).
Type. USSR, E Siberia, Chitinskaya Oblast, Gorbitza, 1833, *Turczaninov* s.n. (holo. LE—*n.v.*, iso. K).
USSR (E Siberia—Lena-Kolyma, Angara-Sayan, Dauria; Far East—Zeya-Bureya, Okhotsk).

Plant subscapose 20–70 cm tall; stem simple. Leaves small, orbicular, 3–8 cm broad, 5–7-parted to $^1/_5$–$^1/_6$ from the base, teeth ovate or lanceolate, sparsely spreading-hairy or curled-hairy or glabrate beneath. Inflorescence curled-hairy, 4–20 cm long, lax; flowers few, 3–14; pedicels 5–22 mm long in flower, up to 60 mm in fruit; bracteoles linear. Helmet curled-hairy, 10–16 mm high, 3–4 mm wide. Petals slender, glabrous, spur equal in length to or slightly shorter than lamina, semi-spiral to spiral. Carpels usually glabrous, sometimes slightly hairy. Fig. 1L.

The authority for *A. ranunculoides* is usually cited as Turczaninow but it was not validly published as such either in 1838 or 1842. In *Fl. Baic.-Dahur.* it was cited only as a synonym of *A. lycoctonum* β. Ledebour clearly refers to the same species as "*A. ranunculoides* (Turcz. Cat. Baikal Nro. 71)" followed by a Latin description. It seems obvious that Ledebour was validating Turczaninow's *nomen nudum* of 1838.

26. A. ajanense Steinb. in Fl. URSS 7:197, 727 (1937).
Syn.: *A. umbrosum* (Korsh.) Kom. var *minus* Nakai in Bot. Mag. Tokyo 46:54 (1932).
A. gigas Lévl. & Van. var *minus* (Nakai) Nakai in Bot. Mag. Tokyo 49:582 (1935).

Lycoctonum gigas (Lévl. & Van.) Nakai var. *minus* (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937).

Lycoctonum paishanense (Kitagawa) Nakai var. *minus* (Nakai) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:14 (1953).

L. ajanense (Steinb.) Nakai, *ibid.*:11 (1953).

L. ajanense (Steinb.) Nakai var. *sachalinense* Nakai, *ibid*:12 (1953).

Type. USSR, Khabarovsk Kray (Okhotsk), ad ripam maris Ochotensis ad sinum Ajan, 7 viii 1916, coll. *Hydro Exp. East Ocean* (holo. LE—*n.v.*). USSR (Far East—Okhotsk, Udsk, Sachalin).

The type specimen of *A. ajanense* (LE) has not been seen but apart from the larger helmet it does not seem to be very distinct from *A. ranunculoides* and could well be synonymous with it. Other material examined in Leningrad (by M.T.) and named as *A. ajanense* cannot be distinguished from *A. ranunculoides*.

A. umbrosum var. *minus* resembles *A. ranunculoides* in general facies but we regard it as a dwarf form of *A. ajanense* particularly because of its geographical distribution in Sachalin.

L. ajanense var. *sachalinense* is only a form of *A. ranunculoides* with the underside of the leaves spreading-hairy at the veins.

27. A. crassifolium Steinb. in Fl. URSS 7:199, 728 (1937).

Type. USSR, Sovetskaya Gavan, 18 iii 1916, *N. P. Krylov* (holo. LE—*n.v.*). USSR (Far East—Ussuri).

Plant subscapose, up to 80 cm tall; stem simple or slightly branched, curled hairy in the upper part and sometimes spreading-hairy below. Leaves orbicular, 6–14 cm broad, divided $\frac{1}{4}$–$\frac{1}{6}$ from the base, underside spreading-hairy, teeth obtuse, ovate. Inflorescence curled-hairy; flowers few (6–20); pedicels 5–25 mm long in flower. Helmet 5–20 mm high, 3–5 mm broad, curled-hairy. Petals glabrous, spur coiled. Carpels curled-hairy, sometimes glabrate.

Ser. **Lycoctonia** Tamura & Lauener, **ser. nov.**

Syn.: Sect. *Lycoctonum* DC., Syst. Nat. 1:365 (1817), *p.p.*

Ser. *Umbrosa* Steinb. in Fl. URSS 7:201 (1937), *nom. inval.*, *p.p.*

Ser. *Longicassidata* Steinb. in Fl. URSS 7:201 (1937), *nom. inval.*, *p.p.*; Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965), *nom. inval.*, *p.p.*

Sect. *Lycoctonum* DC. subsect. *Eulycoctonum* Vorosh. ser. *Kryloviana* Vorosh. in Journ. Bot. URSS 30:128 (1945), *nom. inval.*

Sect. *Lycoctonum* DC. subsect. *Vulparia* Vorosh. ser. *Moldavica* Vorosh. in Journ. Bot. URSS 30:130 (1945), *nom. inval.*

Sect. *Curvicassidata* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:3 (1953), *p.p.*

Sect. *Longicassidata* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:9 (1953), *p.p.*

Sect. *Umbrosa* [Steinb. ex] Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:13 (1953).

Planta ad 200 cm alta, erecta, interdum decumbens. Folia ad 30 cm lata vel ultra, ad $^1/_3$–$^1/_{10}$ supra basim partita (interdum fere ad basim), dentibus ovatis vel lanceolatis, acutis vel acuminatis. Inflorescentia racemosa, pedicellis sub anthesi 4–(8–40)–70 mm longis. Cassis 14–25 mm alta, 3–10 mm lata. Calcaria petalorum plerumque circinata vel curvata (vel fere erecta), laminis longiora. 14 species.

Type species. *A. lycoctonum* L. sensu DC. (*A. vulparia* [Reichb. ex] Spreng.).

28. A. septentrionale Koelle, Spicil. Acon. 22 (1786); Tutin in Fl. Europ. 1:211 (1964); Orlova in Fl. Murmansk Reg. 3:263 (1956).

Syn.: *A. lycoctonum* L. Sp. Pl. 532 (1753) *nom. ambig., p.p.*

A. excelsum Reichb., Ill. Sp. Acon. Gen. t. 53 (1825); Steinb. in Fl. URSS 7:201, t. 13, f. 4a–d (1937); Kitagawa in Journ. Jap. Bot. 19:66 (1943); Vorosh. in Journ. Bot. URSS 30:128 f. 1f (1945) & in Byull. Glav. Bot. Sad. 64:37 (1967); Popov, Fl. Cent. Sib. 1:239 (1957).

Lycoctonum excelsum (Reichb.) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:7 (1953).

Type. Specimen in Linnean herb.

Europe (Norway, Finland, Sweden), USSR (widespread), Mongolia, China (Dahuria).

Plant (60–)80–150(–200) cm tall. Leaves (5–)7–9-partite, divided $^1/_4$–$^1/_{10}$ from the base, reniform-orbicular, segments incised into lanceolate teeth, underside spreading-hairy. Inflorescence sometimes branching in the lower part, always spreading-hairy, up to 50 cm long; flowers many, up to 50 in number; pedicels arcuate-ascending up to 10–35(–70) mm long in flower; bracteoles linear. Flowers various shades of violet. Helmet usually sparsely spreading-hairy, 16–25 mm high, 3–5 mm broad. Petals glabrous, slender, sometimes not reaching top of helmet; spur as long as, or slightly longer than, lamina, semispiral. Carpels glabrous. Fig. 1M.

We follow *Flora Europaea* in retaining *A. septentrionale* for the violet-flowered Scandinavian aspect of *A. lycoctonum* L.

29. A. moldavicum Hacquet ("*moldauicum*") Neueste Phys.-Polit. Reise Karp. 1:169, t. 7 (1790); Reichb., Uebers. Acon. 67 (1819); Vorosh. in Journ. Bot. URSS 30:130 (1945); Tutin in Fl. Europ. 1:212 (1964).

var. **moldavicum**

Syn.: *A. septentrionale* Koelle var.β *carpathicum* DC., Syst. Nat. 1:370 (1817).

A. moldavicum Hacquet subsp. *carpaticum* (DC.) Dost., Kvetana CSR 2:150 (1950).

Type. Described from Moldavia but no specimens cited; if none is extant then the type may be taken as the illustration in Hacquet's work.

Europe (Czechoslovakia, Hungary, Poland, Romania, USSR—W Ukraine).

Underside of leaves curled- or spreading-hairy, sometimes glabrate. Inflorescence always curled-hairy. Flowers blue. Helmet curled-hairy, with more or less straight sides, not very constricted in the middle, 15–23 mm high, 4–7 mm wide. Carpels glabrous.

A. moldavicum is closely related to *A. septentrionale* and differs mainly in the type of hairiness of the inflorescence, the shape of the helmet, and in geographical distribution. Several forms of *A. moldavicum* are enumerated by Grintescu in Savulescu, *Fl. Reip. Pop. Romania* 2:495–498 (1953).

In *Flora Europaea*, Tutin cited the authority of *A. moldavicum* as Hacq. ex Reichenb. but it is clear from Hacquet's protologue that the species is validly published and described. The name "*A. moldauicum*" appears only on tab. VII but Hacquet's intention is quite clear. The plate is "a neatly hand coloured piece of engraving showing a whole plant plus the details named A–H in the description", (Miss Haesler, Librarian, M, *in litt.*).

Under *A. moldavicum* Hacquet, Reichenbach cited "Hab. ad Moldaviam Bohemiae flumen Hacquet! Hb. Vahlii". It might appear from this that Hacquet described a plant from the Moldau (Vltava) river in W Czechoslovakia but it is known that Hacquet was referring to Radautz (Radauti) in the Sucelava province in the area of the Moldava river (German—Moldau) in Romania, at the southern end of the Carpathian mountains.

There is no specimen of *A. moldavicum* in the microfiche of the Vahl herbarium but if there is not an existing herbarium type specimen, the species can be typified by the plate in Hacquet's work. This publication may be seen in the Bayerische Staatsbibliothek, Munich.

29a. A. moldavicum Hacquet var. **sinomontanum** (Nakai) Tamura & Lauener, **comb. nov.**

Syn.: *A. lycoctonum* auct. non L.; Fin. & Gagnep. in Bull. Soc. Bot. Fr. 51:501 (1904), *p.p.*

A. sinomontanum Nakai in Rep. 1st Sci. Exp. Manch. sect. 4, 2:146, f. 19 (1935); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965).

Lycoctonum sinomontanum (Nakai) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:8 (1953).

A. excelsum auct. non Reichb.; Hand.-Mazz. in Acta Hort. Gotob. 13:82 (1939).

L. shansiense Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:6 (1953).

L. togashii Nakai, *ibid.*:10 (1953).

Type. China, Hopei, Hsiao-wu-tai-shan, 1914, *I. Nagai* 100 (holo. *A. sinomontanum* TI).

China (Hopei, Shansi, Hupeh, Kansu, Szechuan, Shensi).

We have compared many specimens of vars. *sinomontanum* and *moldavicum* and are unable to find any significant morphological distinction. The hairiness of the inflorescence and the shape of the helmet of both are exactly the same and geographical distribution is the only distinction. The same variation in the hairiness of the underside of the leaves is present in both taxa. There are no collections in the region between the distribution areas of the European and Chinese taxa but for convenience we designate the latter at varietal rank.

L. shansiense and *L. togashii* were based on two different specimens of the same collection from Shansi, Wu-tai-shan, 26 vii 1942, *Togashi* 974 (NSM). Nakai, for some unknown reason, gives the flower colour of *L. togashii* as yellow, but this information cannot be substantiated.

29b. A. moldavicum Hacquet var. **sinomontanum** (Nakai) Tamura & Lauener f. **pilocarpum** (W. T. Wang) Tamura and Lauener, **comb. nov.**

Syn.: *A. sinomontanum* Nakai var. *pilocarpum* W. T. Wang in Acta Phytotax Sin. 12, Addit. 1:62 (1965).

Type. China, Szechuan, Ma-er-kang, *H. Li* 71474 (holo. PE—n.v.). China (Szechuan).

The carpels of *A. moldavicum* and var. *sinomontanum* are constantly glabrous so we maintain Wang's hairy-carpelled taxon under the above new combination.

30. A. wardii Fletcher & Lauener in Notes R.B.G. Edinb. 20:188, t. 266 f. 17 (1949); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965). var. **wardii**

Syn.: *A. brevicalcaratum* auct. Edin.; Notes R.B.G. Edinb. 17:96 (1929). *A. leucostomum* Vorosh. in Byull. Glav. Bot. Sad. 11:62, f. la & b (1952) & 64:36 (1967); Gamajunova in Pavlov, Fl. Kazachst. 4:49, t. 6, f. 4 (1961); W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:63 (1965); Pachom. in Consp. Fl. As. Med. 3:187 (1972), **syn. nov.**

Type. China, Szechuan, 10 miles south of Muli, *Kingdon Ward* 4825 (holo. *A. wardii*, E).

USSR (Central Asia—Balkhash, Dzungaro-Tarbagatai, Tian-Shan), W Mongolia, China (Sinkiang, Kansu, Szechuan).

Leaves 5–7-partite, reniform or orbicular, 7–15 × 10–20 cm, pubescent on the nerves below. Inflorescence simple or branching a little towards the base. Flowers violet. Helmet 20–25 mm high, 3–5 mm broad. Petals glabrous; spur circinate, lamina geniculate.

A. wardii appears to differ from *A. septentrionale* in the underside of the leaves being generally curled-hairy and in the pedicels which are more erect and appressed to the stem and shorter (7–20 mm long in flower). However, these characters are variable and it is not always easy to distinguish these two species, but the distribution is distinct.

According to Voroshilov's key *A. leucostomum* has a dense raceme with pedicels shorter than the flowers and appressed to the inflorescence axis, whereas "*A. excelsum*" has a loose raceme with the lower pedicels curved and longer than the flowers.

Although we have not seen the type of *A. leucostomum* we have examined *Roldugin* 4407 (E, K, LE), presumably correctly named at Leningrad, and other specimens. They have glabrous carpels but this does not distinguish them from *A. wardii*, in which carpels are hairy or glabrous, and we consider the two species synonymous.

30a. A. wardii Fletcher & Lauener var. **hopeiense** (W. T. Wang) Tamura & Lauener, **comb. nov.**

Syn.: *A. leucostomum* Vorosh. var. *hopeiense* W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:63 (1965).

Type. China, Hopei, Wu-ling-shan, 900–1500 m, *Fac. Biol. Univ. Nankai* 4 (holo. PE—*n.v.*).

China (Hopei).

Wang differentiated this variety from *A. leucostomum* partly on the basis of spreading pedicels, which, in fact, is a character typical of *A. septentrionale*. Var. *hopeiense* is found further east than the type variety and forms a disjunct distribution with it.

31. A. angustius (W. T. Wang) W. T. Wang in Acta Phytotax. Sin. 12, Addit. 1:62 (1965).
Syn.: *A. sinomontanum* Nakai var. *angustius* W. T. Wang in P.C. Chen et al., Obs.Fl. Huangshan 114 (1965).
Type. China, Kiangsi, Lu-shan, *Y. K. Hsiung* 6741 (holo PE—*n.v*, photo. E).
China (Kiangsi).

We have not seen the type specimen of *A. angustius* but according to Wang it differs from *A. sinomontanum* by the shorter pedicels, 4–10 mm long, and by the narrower helmet, 2·5–4 mm broad. Dr Wang has kindly informed us that the flower colour of *A. angustius* is white to pale purple.

32. A. orientale Mill. in Gard. Dict. ed. 8, no. 10 (1768); Steinb. in Fl. URSS 7:203 (1937); Vorosh. in Journ. Bot. URSS 30:128, f. 4a (1945); Davis, Fl. Turkey 1:107 (1965).
Type. Described from cultivated material.
Caucasus, Turkey.

Plant up to 2 m tall. Leaves parted up to $^1/_5$–$^1/_8$ from the base, segments cuneate, teeth lanceolate, acute or acuminate, lower surface curled- sometimes spreading-hairy along the veins. Inflorescence racemose, many-flowered, branching in lower part, branches arcuate-ascending, usually curled-hairy, pedicels 8–18 mm long. Flowers pale pink, lilac or mauve. Helmet 15–25 mm high, 3–5 mm broad, curled- or spreading-hairy. Petal spur longer than lamina, coiled, lamina geniculate. Carpels glabrous.

33. A. iranshahri H. Riedl in Willdenowia 8:319, f. 1 (1978).
Type. Iran, Mazanderan, Sang-Deh, 30 km SE Poli-Sefid, in silvis alpinis, 2000–2500 m, 11 iv 1974, *Renz & Iranshahr*, Herb. Min. Iran Agric. 16765 (holo W, iso. EVIN—*n.v.*).
Iran.

This recently described species is reported as differing from *A. orientale* in the upper sepal being scarcely rostrate, the lateral sepals scarcely ciliate, and in the longer carpels which are at least four times as long as broad.

It is found at the margin of woods in the upper woodland zone.

34. A. ranunculifolium Reichb., Icon. Fl. Germ. 4:22, t. 81, f. 4681b (1840); Gayer, Magyar Bot. Lap. 6:120 (1907) & 8:318 (1909); Hegi, Fl. Mitt. Eur. 3:505, f. 658a–c (1912).
Type. Habitat in alpibus Tyrolensibus, in monte Schlehran:Funk. If the specimen does not exist then the type would be the illustration in Reichenbach's work.
Europe. Austria (Tyrol), Italy (Venetia), France (Pyrenees or., Loire, Lozére), Bulgaria.

Plant small, up to 40–70 cm tall, sometimes more. Leaves orbicular, deeply divided into 3 main segments, but lateral segments also deeply divided so that leaf appears to be palmately 5-partite; segments dissected into laciniate lobes; laciniae linear-lanceolate; underside curled-hairy. Inflorescence densely racemose, curled-hairy rarely spreading-hairy, flowers 12–40 in number, pedicels (4–)8–14(–18)mm long, appressed to stem. Flowers yellow. Helmet curled- or spreading-hairy, 14–18 mm high, 4–7 mm broad. Spur of petal coiled. Carpels curled-hairy or glabrate.

This species is readily distinguished from *A. vulparia* by the more deeply divided leaves.

35. A. monticola Steinb. in Fl. URSS 7:209, 730 (1937); Gamajunova in Pavlov, Fl. Kazachst. 4:52, t. 6, f. 1a & b (1961); Pachom. in Consp. Fl. As. Med. 3:188 (1972).

Syn.: *A. wardii* Fletcher & Lauener f. *flavidum* Fletcher & Lauener in Notes R.B.G. Edinb. 20:188 (1950).

Type. Asia Media, Alatau Soongaricus, Lepsinsk, 14 vi 1909, *R. Roshevitz* (holo. LE—*n.v.*).

USSR (Central Asia—Dzungaro-Tarbagatai), China (Sinkiang).

A. monticola is clearly related to *A. septentrionale* and *A. leucostomum* and differs from both mainly in the shorter helmet, 10–15 mm high instead of 15–25 mm, and yellow as opposed to violet. We have not seen any authentic material of this species.

Steinberg described the flowers as "many times as long or as long as or slightly shorter than their pedicels" which indicates a considerable variation in the length of the pedicel.

According to Gamajunova's key, *A. leucostomum* is a plant of the forest belt whereas *A. monticola* is a high montane alpine.

36. A. krylovii Steinb. in Fl. URSS 7:206, 729 (1937); Vorosh. in Journ. Bot. URSS 30:129 f. 4b (1945) & in Byull. Glav. Bot. Sada 64:37 (1967); Popov, Fl. Cent. Sibir. 1:240 (1957).

Type. Siberia occ., vallis fluv. Kujun, Korocza, *P. N. Krylov* (holo. LE—*n.v.*).

USSR (W Siberia—Irtysh, Altai; E Siberia—Yenisei, Angara Sayan).

Steinberg compares *A. krylovii* with *A. monticola* and, according to his key, *A. krylovii* has "leaf lobes shallowly incised with short sometimes rounded-acuminate teeth, leaf blade ± densely pubescent on both surfaces". The inflorescence is spreading-hairy, flowers bright yellow, and helmet 12–20 mm high by 3–4 mm broad. The petal-spur is strongly elongated and slightly curved (*ex descr.*).

37. A. puchonroenicum Uyeki & Satake in Acta Phytotax. Geobot. 7:14, f. 1 (1938).

Syn.: *Lycoctonum puchonroenicum* Uyeki & Satake in Acta Phytotax. Geobot. 7:14, f. 1 (1938), *in sched. pro syn. sub A. puchonroenicum*.

L. ranunculoides auct. non (Turcz.) Nakai; Nakai in Bull Nat. Sci. Mus. Tokyo no. 32:10 (1953), *p.p.*

Type. Korea, Kan-Nan, in monte Fusenrei, Shinko Gun, 25 vii 1936, *T. Sakata* s.n. (syntype—*n.v.*); Kogen, in summo Biroho, Mt. Kongosan, viii 1932, *T. Sakata* 1474 (syntype, Herb. Scola Agricul. Suigen—*n.v.*). These types are probably in the Faculty of Agriculture, Seoul University, Korea.
China (Liaoning), N Korea.

Plant 40–120 cm tall. Leaves up to 16 × 21 cm, curled-hairy mainly on the veins beneath, deeply divided but not to the base, segments 2–4-fid, teeth lanceolate, acute or acuminate. Inflorescence loosely branched, main raceme 10–13-flowered, others 3–10-flowered; bracts linear, 5–12 mm long; pedicels up to 2 cm in flower, 3(–5) cm in fruit, covered with spreading yellowish glandular hairs. Flowers yellow. Helmet 16–23 mm high, 4 mm broad at the narrowest part, ± recurved at the top, hairs similar to those on the pedicels. Spur of petal semi-circinate, lamina 3·5 mm long. Carpels hispid.

This species somewhat resembles *A. septentrionale* but differs from it in its yellow flowers. It differs from *A. umbrosum* and *A. ranunculoides* (to which Nakai reduced *A. puchonroenicum*) in the spreading-hairy pedicels and the shape of the helmet.

38. A. umbrosum (Korsh.) Kom. in Acta Hort. Petrop. 22:250 (1904); Nakai in Bot. Mag. Tokyo 31:223 (1917), *p.p.*, & in Rep. 1st Sci. Exp. Manch. sect. 4, 2:147 (1935); Steinb. in Fl. URSS 7:199, t. 13, f. 2a–d (1937).
Syn.: *A. pallidum* auct. non Reichb.; Maxim. in Mém. Acad. Imp. Sci. St. Pétersb. 9:24 (1859).
A. lycoctonum L. subsp. *genuina* f. *umbrosum* Korsh. in Acta Hort. Petrop. 12:300 (1893).
A. paishanense Kitagawa in Rep. Inst. Sci. Res. Manch. 5:152, f. p. 153 (1941).
Lycoctonum paishanense (Kitagawa) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:14 (1953), *comb inval.*
Type. USSR, in sylvis frondosis primaevis in promontorius jugi Chingan a Bidshansky septentrionem versus, 20 vi 1891, *Soc. Imp. Geog.* (holo. LE—*n.v.*).
USSR (Far East—Okhotsk, Zeya-Bureya, Udsk, Ussuri, Sachalin), China (N E Distr.—Manchuria, Kirin), N Korea.

Stem up to 100 cm tall. Leaves similar to those of *A. gigas*, underside spreading-hairy, sometimes curled-hairy or glabrate. Inflorescence loosely branched or simple, main raceme 4–15-flowered; bracts linear; bracteoles linear, minute, situated usually near the base of the pedicel; pedicels curled-hairy, 10–40(–70) mm in flower. Flowers yellow. Helmet c. 15–26 mm high, 5–9 mm broad in the narrowest part. Spur of petal circinate, lamina 4–5 mm long, geniculate (distinctly so in Sachalin plants).

This species is distinguished from *A. gigas* var. *hondoense* by the loose and fewer-flowered inflorescence and the longer pedicels, though these characters are variable. *A. umbrosum* is also near to *A. ajanense* but has wide helmets. However, the latter character is also variable, especially in the plants from Sachalin where there are many intermediate forms between the two species.

The hairs on the veins of the underside of the leaves are spreading in Sachalin plants but sometimes curled in plants of the continental part of the distribution.

A. lycoctonum subsp. *genuinum* f. *umbrosum* Korsh. was based on a specimen from Chingan on Bidshansky in the Keilukiang province of NE China (Manchuria). When Komarov raised f. *umbrosum* to specific rank he cited five specimens (including one from Chingan) all collected later than the type of f. *umbrosum*, and none of these can be regarded as type material. We have not seen Korshinsky's type but according to the description the important features are "pedunculi . . . 40–55 mm longi . . . casside cylindrica circa 20 mm longa, 12 mm lata, medio subconstricta . . . nectarii calcare annulato".

According to Nakai *A. umbrosum* (Korsh.) Kom. is antedated by Colla's homonym and cannot be credited to Komarov, but *A. umbrosum* Colla is a *nomen nudum*.

Aconitum paishanense has not been listed in *Index Kewensis*.

39. A. gigas Lévl. & Van. in Bull. Soc. Bot. Fr. 53:389 (1906); Nakai in Bot. Mag. Tokyo 25:53 (1911) & 49:581 (1935); Lauener & Green in Notes R.B.G. Edinb. 23:576 (1961), *p.p. quoad typus*.

var. **gigas**

Syn.: *A. pallidum* auct. non Reichb.; Nakai in Bot. Mag. Tokyo 22:131 (1908), *p.p.*

A. umbrosum auct. non (Korsh.) Kom.; Nakai in Bot. Mag. Tokyo 31:223 (1917), *p.p.*

A. tatewakii Miyabe in Trans. Sapporo Nat. Hist. Soc. 14:71, f. 5a & b (1935).

A. tatewakii Miyabe var *vegetum* Miyabe, *ibid.*:72, f. 5c (1935).

Lycoctonum gigas (Lévl. & Van.) Nakai in Journ. Jap. Bot. 13:406 (1937) & in Bull. Nat. Sci. Mus. Tokyo no. 32:15 (1953).

L. gigas (Lévl. & Van.) Nakai var. *tatewakii* (Miyabe) Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:16 (1953).

Type. Japan, Yezo (Hokkaido) in silvis Jirafu, vii 1905, *Faurie* 6934 (holo. TI; iso. BM, KYO).

Japan (Central Honshu—Kodzuke, Shimotsuke, Shinano; Hokkaido).

Underside of leaves usually spreading-hairy but sometimes glabrous. Racemes densely 10–40-flowered, pedicels 8–25(–35) mm long. Petal limb short, 3–7 mm long, ± at right angles to stalk, slightly curved or nearly straight, spur 0·5–2 mm long. Carpels usually glabrous but sometimes hispid.

The development of the petals is variable in this species. *A. tatewakii* is a form of *A. gigas* in which the petals are extremely poorly developed. In the isotype of *A. gigas* (in TI) and the isotypes (in BM, KYO) the limb of the petals is about 5·5 mm long and the spur about 1·8 mm long. These petals are more similar to those of *A. tatewakii* than to those of *A. gigas* var. *hondoense*.

39a. A. gigas Lévl. & Van. var. **hondoense** [Nakai ex] Tamura & Lauener, **comb. nov.**

A varietate typico limbis elongatis calcaribus circinatis vel semi-circinatis differt.

Syn.: *A. pallidum* auct. non Reichb.; Makino in Bot. Mag. Tokyo 19:302 (1905); Nakai in Bot. Mag. Tokyo 22:131 (1908), *p.p.*
A. thelyphonum auct. non Reichb.; Nakai in Bot. Mag. Tokyo 22:131 (1908), *excl. syn.*
Lycoctonum paishanense (Kitagawa) Nakai var. *hondoense* Nakai in Bull. Nat. Sci. Mus. Tokyo no. 32:14 (1953), *nom. & var. inval.*

Type. Japan, Honshu, Shinano, Mt. Norikura-Kaminotambo, 22 viii 1936, *K. Hisauchi* 1794 (lecto. var. *hondoense*, TNS).

Japan (N & Central Honshu—Ugo, Rikuchu, Iwashiro, Kodzuke, Shimotsuke, Etchu, Shinano, Kaga; Hokkaido).

The underside of the leaves is generally spreading-hairy but in the western part of the distribution area the hairs are often curled. The petal limb is longer than 8 mm and the spur curved or circinate and longer than 4 mm.

This variety is rare in Hokkaido whereas var. *gigas* is quite common. Although Nakai provided a Latin description for his *L. paishanense* var. *hondoense*, *L. paishanense* itself was an invalid combination as he did not cite the basionym of the type variety.

40. A. vulparia [Reichb., Uebers. Acon. 70 (1819), nom. nud. ex] Spreng., Syst. 2:620 (Jan.–May 1825); Reichb., Ill. Sp. Acon. Gen. t. 56–58 (1827), excl. *A. moldavicum*; Gayer in Magyar Bot. Lap. 8:320 (1909).

Syn.: *A. lycoctonum* L., Sp. Pl. 532 (1753), *nom. ambig.*, *p.p.*
A. lamarckii [Reichb. ex] Spreng., Syst. Veg. 2:620 (Jan.–May 1825); Reichb., Ill. Sp. Acon. Gen. t. 55 (Aug. 1827).
A. neapolitanum Ten., Fl. Nap. 4:327 (1830).
A. atlanticum Coss. in Bull. Soc. Bot. Fr. 22:53 (1875), *nom. nud.*
A. lycoctonum L. subsp. *neapolitanum* (Ten.) Lit. & Maire var. *rerayense* Lit. & Maire in Mém. Soc. Sci. Nat. Maroc. 4(1):4 (1924); Jahandiez & Maire, Cat. Pl. Maroc. 2:243 (1932); Maire, Fl. Afr. Nord. 11:88 (1964).
A. lycoctonum L. subsp. *neapolitanum* (Ten.) Lit. & Maire var. *atlanticum* (Coss.) Maire, Fl. Afr. Nord. 11:88 (1964), *comb. nud.*

Type. Type specimen not known. If none exists then type would be the illustration in Reichenbach's work.

Europe (widespread), N Africa.

Plant 40–120 cm tall. Leaves orbicular to orbicular-reniform, parted to $^1/_4$–$^1/_{10}$ from the base, segments cuneate to broadly cuneate, teeth ovate to lanceolate, acute or acuminate, underside spreading-hairy or curled-hairy or glabrate. Inflorescence racemose, lax with few flowers or dense with many flowers, curled- or spreading-hairy, flowers 3–40 in number, pedicels (6–) 14–24(–40) mm long; longer pedicels arcuate-ascending in lax inflorescence, shorter erect. Flowers yellow. Helmet 14–25 mm high, 5–9 mm broad, curled- or spreading-hairy or glabrate. Spur of petal coiled. Carpels densely curled- or spreading-hairy or glabrous.

In his unpublished work Warncke treated the yellow-flowered groups of *A. lycoctonum* as *A. lycoctonum* subsp. *lycoctonum* (syn. *A. vulparia*) and *A. lycoctonum* subsp. *ranunculifolium* (syn. *A. lamarckii*). In *Flora Europaea* (1964) Tutin followed this treatment but at specific rank as *A. vulparia* and

A. lamarckii. A. vulparia has shallowly divided leaves and small, few-flowered inflorescences, whereas *A. lamarckii* is represented by specimens with more deeply divided leaves and larger, many-flowered inflorescences.

In Hess, Landolt and Hirzel, *Flora der Schweiz* 2:18 (1970) this group is divided into 4 species: *A.vulparia*, *A. ranunculifolium*, *A. platanifolium* and *A. penninum. A. penninum* is separated from the others by presence of glandular hairs and straight spreading hairs. The first three species are differentiated from each other on leaf characters. *A. lamarckii* is regarded as a synonym of *A. ranunculifolium* but we find it a very distinct, easily recognizable taxon and therefore retain it as a distinct species.

In an attempt to find a clearer line of demarcation we divided the available specimens into groups according to leaf division, density of flowers on the inflorescence, and hair-type—all of which were considered as important characters in the above-mentioned works. We were unable to find any correlation among these characters but were able to separate the specimens into eight groups. Apart from *A. ranunculifolium*, it would be possible, therefore, to divide this yellow-flowered group into several infra-specific taxa, which, however, would overlap in other characters. Geographically it may be significant that in the southern part of the distribution area we did not find any specimens of the group with shallowly divided leaves.

The question now is which name should be applied to this yellow-flowered group. At present the name *A. vulparia* is in use generally. However, there are older names, according to Warncke, such as *A. altissimum* Mill. (1768), *A. toxicarium* Salisb. (1796), and *A. galeriflorum* Stokes (1812). The latter two may refer to a mixture of blue- and yellow-flowered plants and in any case are later than *A. altissimum*. The entry under *A. altissimum* Mill., *Gard. Dict.* ed. 8, Acon. no. 2 reads "A. (altissimum) foliis palmatis nervosis glabris, Greatest yellow Wolfsbane, with nervous smooth, palmated leaves. Aconitum luteum majus ampliore caule amplioribusque foliis. Dod. p. 441".

We can see no reason at present why *A. altissimum* should not be used as the oldest name for this group, but until such time as this can be verified, we reserve this name and continue to use *A. vulparia.*

Plants of this group from Morocco have been called *A. lycoctonum* subsp. *neapolitanum* var. *rerayense* by virtue of the petal being arcuate and not coiled. We have not seen the type of var. *rerayense* but we have examined Moroccan specimens and the petal is variable and quite within the range of those found in European specimens. The leaves are deeply divided and the inflorescence many-flowered, usually densely so, but sometimes lax, and the carpels glabrous. In addition, the pedicels are spreading- or curled-hairy as in the typical species. It is obvious that Moroccan yellow-flowered plants are related to southern European forms of *A. vulparia* and if considered of infraspecific rank at all, should at least be related to that species.

41. A. pauciflorum Host, Fl. Aust. 2:70 (1831); Gayer in Magyar Bot. Lap. 322 (1909).

Syn.: *A. vulparia* Reichb. var. *pauciflorum* (Host) G. Beck, Fl. Nied.-Ost. 1:402 (1890).

A. vulparia Reichb. subsp. *pauciflorum* (Host) Gayer in Hegi, Fl. Mitt. Eur. 3:505 (1911).

Type. In sylvis umbrosis prope Bertholdsdorf [Perchtoldsdorf]. Fl. a Julio ad Septembrin. *n.v.*

Austria, Yugoslavia.

Leaves divided to $^1/_3$–$^1/_5$ from the base, glabrous on both sides. Inflorescence lax, about 10-flowered, pedicels 10–12 mm long. Helmet 18–20 mm high, about 5 mm wide, glabrous.

A. pauciflorum, a species inhabiting shady places, somewhat resembles the various forms of *A. vulparia* which have shallowly divided leaves and lax inflorescences, but is clearly distinguished by being glabrous in all its parts. Contrary to the *Flora Europaea* treatment, we have no hesitation in retaining *A. pauciflorum* as a distinct species.

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LIST OF SELECTED EXSICCATAE

The name of the collector is followed by the number or date of the collection, then the herbarium symbol and lastly the number of the species in brackets (see summary of classification p. 432). Only specimens which have been seen are listed, but many European collections are omitted as they are too numerous to list fully.

The collections at Osaka University, for which there is no official symbol, are indicated by "Hb. Univ. Osaka".

Anderson,J.G.,453,E(22a)
Appleton,H.,734,K(19);748,K(30)
Archibald,J.C.,155,E(40)
Arseniev,A.N.,a.1909,LE(27)
Atkinson,W.S.,24259,A,K(8)

Baenitz,C.,6414,E(28)
Balansa,B.,1354,K(32)
Balls,E.K.,493,1694,E(32);2970,3120,K(40)
Balls,E.K.&Gourlay,W.B.,3949,E,K(40)
Beer,L.,9595,BM(3)
Bisset,J.,3463,BM,E(11)
Blagoweschtschensky,N.W.,388,K(22)
Bock,C.&vonRosthorn,A.,905,lecto. *A.vaginatum*,O(4);123,1082,O(4)
Bodinier,E.,1790,E,P(15);1886,E,P(5)
Bohnhof,H.,283,K,P(22)
Bor,N.L.,11931,K(8)
Bornmüller,J.,4viii1904,E(28)
Bozeman,J.R.,Radford,A.E.&Culwell,D.,10684,E(9)
Bretschneider,E.,159,K(23)
Bullock,T.L.,s.n.,holo.*A.finetianum*,K(15)

Cavalerie,J.,708,E,K,P(5);2553,E,P(4);3830,E,P(15);viii1908,holo.*A.lycoctonum* var.*circinatum*E,iso.BM(4)
Cave,G.H.,20ix1916,1ix1919,E(3)
Chaffanjon,J.R.,759,1013,1015,P(35)
Chanet,L.,770,K(23)
Chanet,L.&Serre,J.,290,3005,P(22a)
Chazaud,M.B.du,121,P(22)
Chen,F.H.,393,BM(10);395,BM(22)
Cherepanov,S.K.,326,LE(23)
Ching,R.C.,334,E(29a)
Cho,K.,29ix1940,TNS(15)
Clarke,C.B.,29284,BM(8)
Collet,H.,916,K(8)
Cooke,F.&Patzak,A.,10viii1960,E(41)
Cooper,R.E.,519,E(3);4288,E(2);4995,E,P(8)
Coventry,B.O.,920,K(1)
Cowdry,N.H.,1921,K(22)
Cunningham,R.,233,499,E(4)

David,A.,s.n.holo.*A.lycoctonum* var. *volubile*,P(15);491,P(22);2246,P(22a);2250,P(29a);2277,P(22a)
Davis,P.H.,20496,20903,21123,32154b,32228,E,K(32);55460,E(40)
Delavay,J.P.,975,syntype*A.brevicalcaratum*,K,P(21);3212,syntype*A.brevicalcaratum*,P(21)
Dhwoj,L.,555,BM,E(3)

Dickins,F.V.,9177,P(11)
Docturovsky,W.,1424,LE(25)
Drummond,J.R.,1202,BM(8);4362,14200, K(8);14287,K(1)
Dubiansky,W.&Basilevskaja,13viii1927, LE(35)
Ducloux,F.,4102,6565,P(4)
Duthie,J.F.,12604,BM,E(8);13117,BM,E (8);13191,syntype*A.moschatum*,DD(1); 13925,K(8);14120,syntype*A.moschatum*, BM,DD,E,K(1);14810,P(8)

Falconer,H.,67,K,P(8)
Fang,W.P.,4069,E,K(29a);4224,A,E,K,P (4);4263,E,K(4)
Farges,P.,7,K,P(4);116,holo.*A.scaposum*P, iso.K(4);116,holo.*A.scaposum* var. *pyramidale*,P(4)
Farrer,R.,739,E(29a);1290,E(4)
Farrer,R.&Purdom,W.,232,739,E(29a)
Faurie,U.,27,E,P(11);29,E,P(15);164,BM, E(15);461,E,KYO(38);1386,P,TI(15); 2821,5416,P(39);6934,holo.*A.gigas*TI, iso.BM,KYO(39);6987,P(39);7987,P (39);13704,P,TI(15)
Fischer,M.,a.1836,P(22)
Forbes,F.B.,176,824,BM(15)
Forrest,G.,290,E(30);2777,E,K,P(21);4369, holo.*A.jucundum*E,iso.BM(4);6460,BM, E,K,P(21);6559,holo.*A.lauenerianum*,E, iso.BM,K,P(21a);9259,E(4);11098,E,K (21);14781,E,K(30);15065,E,K(21); 15119,BM,E,K(21a);15535,E,K(21a); 18481,E,K,P(4);22225,E,K(21a);24847, E,K(4);28057,BM,E(4);28528,E(4); 28788,BM,E(30).
Fujimoto,S.&Kobayashi,Y.,26viii1929, holo.*A.ajanense*var.*sachalinense*,KYO(26)
Fukushima,K.&Nakao,S.,7viii1952,KYO (12)
Furse,P.,3989,K(32)

Gabrielian,E.,12713(32)
Gamble,J.S.,24157,24946,25707,K(8)
Gammie,G.A.,a.1892,K(3)
Goring,P.E.W.,129,378,P(11)
Gould,B.J.,1513,K(3)
Gray,A.,9vii1841,holo.*A.reclinatum*,NY— n.v.,iso.E–GL,K(9)
Grintescu,G.P.,2756,2757,K(29);2758,K (40)
Gudoshnikov,S.V.,2–10viii1960,K(20)

Handel-Mazzetti,H.,4107,WU(21a);4487, holo.*A.crassiflorum*,WU(7);7691,E,WU (7);7823,WU(7);7909,holo.*A.chloranthum* WU,iso.E,P(4a);10050,E,WU(21a)
Hara,H.,4viii1931,holo.*A.umbrosum* var. *minus*,TI(26)
Hashimoto,R.,13viii1936,TNS(39a)
Harriss,S.A.,15830,BM,E,K(8a)
Hattori,S.,6x1925,TI(11)
Hayata,B.,1ix1924,holo.*A.fudjisanense*,TI (11)
Heller,A.A.,6,E(9)
Hemeling,Dr.,192,193,E(22a)
Henry,A.,2075,K(29a);4900,4901,K(4); 5904,BM,E,K(29a);6426,BM,E,P(29a); 6501a,P(4);6547,K(4);6547a,syntype*A. scaposum* var.*efoliatum*,A,BM,E,P(4); 6547b,K(4);6828,BM,K(4);6867,A,BM, K(4);7307,A,BM(4);7423,K(4)
Hibbert,E.A.,89b,125,K(28)
Hisauchi,K.,1794,lecto.*A.gigas* var. *hondoense*,TNS(39a)
Honda,M.,14ix1947,TI(11)
Honda,M.&Kitagawa,M.,13ix1933,TI(10)
Hooker,J.D.,22vii1849,7xi1849,syntypes *A.luridum*,K(3)
Hoshino,Y.,Okada,S.&Sugiyama,S.,28vii 1933,4&8viii1933,SAP(38)
Hosoi,K.,17ix1960,TNS(15)
Hotta,M.,6479,10191,TNS(11)
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Ikuma,Y.,22vii1914,TNS(10);5viii1914,8 viii1914,TNS(23)
Imai,H.,175,TI(22)
Inami,K.,x1961,TNS(15b)
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Karelin,G.S.,&Kiriloff,I.P.,1171a,P(28)
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Kolasnikov,B.,195,LE(17)
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Koyama,H.,1622TNS(15b)
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Kuan,K.C.&Wang,W.T.,417,1958,2012, 2144,K(4)
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Ludlow,F.,Sherriff,G.&Elliott,H.H.,14460, BM,E(3)
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Miyabe,K.&Miyagi,T.,7viii1906,SAP(38)
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Miyabe,K.&Tokobuchi,Y.,10vi1896,holo. *A.tatewakii*var.*vegetum*,SAP(39)
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Murata,G.,8129,holo.*A.pterocaule*var. *glabrescens*,KYO(15b);9351,10818,10822, KYO(11)
Murata,G.&Koyama,H.,188,E,K(11)
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Nabeshima,Y.,12ix1925,KYO(11)
Nagai,Y.,100,holo.*A.sinomontanum*,TI (29a);227,TI(22a)
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Nikai,J.,1265,TNS(11)
Ninoue,S.,22vi1905,SAP(39a)
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Nishimura,M.,29viii1910,TI(10)
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Ogata,M.,632,KYO(11)
Ohwi,J.,7viii1930,KYO(10);25viii1930, KYO,TNS(10);2692,KYO,TNS(22); 4673,4809,KYO(39a);4811,KYO(11); 7105,7963,KYO(39a);10382,TNS(22)
Okamoto,S.,17208,17210,KYO(15);14ix 1935,18ix1935,TNS(15)
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Sato,T.,19x1937,TNS(15);13vi1970,TNS (39)
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Sawada,T.,sine dato,holo.*A.sinanomontanum*,TI(15a)
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Shinagawa,T.22vii1941,TNS(29a)
Shiobara,Y.,28viii1932,TNS(11)
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Smith,H.,6775,BM(22);8116,BM(29a); 8152,BM(22)
Smith,W.W.,4058,BM,E(3);4205,E,K(3)
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Stewart,R.R.&Stewart,I.D.,5830,K(1)
Strachey,R.&Winterbottom,J.E.,4,BM,K, P(8)
Sugawara,S.,6viii1935,SAP(26);10vi1921, 31vii1935,2viii1935,SAP(38);11vi1940, KYO(39)
Suginome,H.,31viii1920,TI(14)

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Takahashi,H.,21viii1967,Hb.Univ.Osaka (15b)
Takahashi,M.4ix1933,TNS(37)
Takahashi,T.,31vii1935,KYO(38)
Takeda,H.,15viii1905,BM(39a)
Takenaka,Y.,32,TI(22a)
Takenouchi,M.,14460,BM(11)
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Tamura,M.&Namba,T.,8570,Hb.Univ. Osaka(39)
Taquet,E.J.,167,TI(13);169,E(11);519,520, E(11)
Tanaka,H.,ii1959,TNS(15b)
Tashiro,S.,30viii1939,KYO(38)
Tashiro,Z.,13x1922,TNS(11)
Tatewaki,M.,27vii1927,holo.*A.tatewakii*, SAP(39)
Tei,D.,ix1926,TI(15)
Thomson,T.,28ix1848,K(8);s.n.,BM,E,P(8)
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Toppin,S.M.,426,K(8a)
Torii,K.,3x1954,TNS(15b)
Turczaninov,N.S.von,a.1833,iso.*A.ranunculoides*,K(25)

Uchida,H.,vii1943,TNS(10);vii1943,TNS (22)
Uchiyama,T.,14viii1902,syntype*A.pseudolaeve*,TI,16viii1902,TI(12);ix1902,holo. *A.longecassidatum*,TI(15)
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Wilson,E.H.,566,BM,E,K(4);1032,A,K(4a); 1033,typus*A.vaginatum* var.*xanthanthum*, A,K(4a);1171,A,K(4);1171a,K(4);1354, 1354a,E,K(29a);1626,1674,1676,K(4); 1678,syntype*A.scaposum* var.*efoliatum*,E, K,(4);1994,BM,K(29a);1996,K(5);1997, A,K(4);2118,K(29a);2146,E,K(29a);2563, K(4);2616,E,K,P(4);3098,BM,K,P(4); 3099,BM,K(4);3100,K(4);4517,4518, 4519,K(4);4524,K(29a);4526,K(4a);4531, K(4);4703,K,P(5);4705,K,P(4);8915,K (23);8978,TI(10);8981,K(10);8991,K(23); 9116,K,TI(10)
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Yamamoto,H.,4viii1935,TNS(11)
Yamamoto,I.,18vi1954,TNS(39)
Yamashita,K.,ix1924,TNS(11)
Yamatuta,K.,113TI(10);1597,1599,TNS(23);1604,TNS(10);1605,TNS(23);1606,TNS(22);1616,TI(22);1639,holo.*L.albo-violaceum* var.*fuscescens*,TNS(10)
Yamazaki,T.,23vii1942,holo.*A.gigas*var.*hondoense*,TI(39a);29viii1952,TI(14);3viii1943,TI(39a);6ix1954–x1954,TI(11)
Yoshinaga,B.,6viii1936,SAP(38)
Yu,T.T.,15389,iso.*A.brevicalcaratum*var.*parviflorum*,BM,E(21)
Yuyama,I.,12ix1925,TI(11)

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